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Vol. XVII APRIL, 1908 No. 7

THE ROSE TECHNIC

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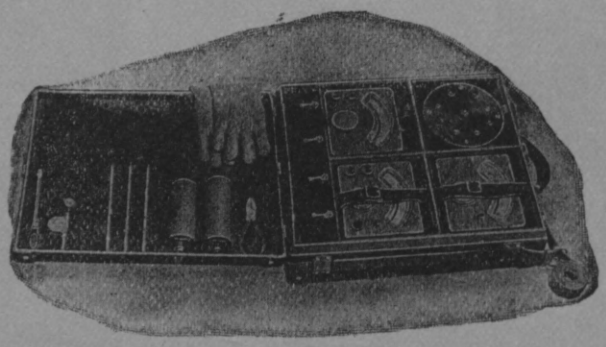

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VOL. XVII. TERRE HAUTE, IND., APRIL, 1908. No. 7

THE TECHNIC.

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IN last month's TECHNIC the statement was made that that *The Modulus* of '96 was the first published. This was a mistake, as the class of '92 issued a Modulus which, without precedent itself, has served as a model for many succeeding ones.

WE print in this issue the full text of the Constitution of the Students' Council as adopted by that body and ratified by the students in general assembly on Mareh 14th, and also the revised By-Laws which were adopted by the Council on April 4th. This publication of the By-Laws is to be considered as the publishing of this act of the Council, as required by the Constitution.

In presenting Mr. Heidenger's article on Modern Locomotive Service, we regret that circumstances compelled us to cut it in two, and to reserve the latter portion, on "Types of Locomotives" for another issue, when it will be presented with illustrations of the prominent types of engines.

THE next two months will be busy ones in athletic circles, for the track men as well as for the baseball fans. The prospective list of track meets is a large one, beginning with an indoor meet between the Y. M. C. A , Wiley High School, I. S. N. and Rose at the Y. M. C. A. gym on April 18th. On April 25th Manager Sievers has scheduled an out-door inter-class meet, when those who came second or third in the recent indoor meet will have another chance to try for first; about the first of May there is to be a dual meet with Milliken at Decatur, to which a team of ten picked men will be sent; on May 9th a dual meet with the Normal at Parson's Field, and on May 16th the I. C. A. L. meet under the joint auspices of I. S. N. and Rose. On May 30th the I. I. A. A. annual meet is to be held at Notre Dame, and the Rose representation at this gathering will be decided by the showing made in the others.

The baseball team will commence its season on April 17th by a game with Purdue, and from that date until June 6th will be fully occupied, there being fifteen games scheduled, seven of which are to be played in Terre Haute. The schedule is printed elsewhere in this issue, and while the teams to be played will give Rose a hard tussle, we believe that Capt. Heidenger's company can give a good account of themselves against any of them.

NOTES ON POWER PLANT DESIGN.

By GEO. E. WELLS,' 96.

IN the following discussion of power plant design, an attempt is made to give general data derived from the writer's experience without particular comment on the fundamental principles involved.

After describing in a general way the various types of power plants, more particular attention is given to power plants using the steam engine as the prime mover.

In the solution of the problem of designing the proper power plant for a factory, central lighting and power station, large office building or other institution of sufficient size to make the installation of a power plant necessary, the local conditions of the fuel and water cost and the particular requirements of the institution in question must determine largely the general type of power plant to be designed and installed.

The engineer, when contemplating the installation of a power plant for a manufacturing institution or office building when same is located in a large city, should first secure a proposal for power from the local power company, and compare the rates outlined in this proposal with the estimated cost of making power. In many cases the engineer will find that his client can buy power cheaper than he can make it.

It often happens, however, that even in large cities when power rates are very low, heating and drying requirements make it advisable for the engineer to advise the installation of a power plant where exhaust steam can be used to advantage.

It is advisable in all cases where the connected load is less than 100 H. P., that the engineer compare carefully his estimated cost of making power with the price quoted by the power company, taking into account the interest on investment, depreciation of machinery, repairs, etc., in addition to the cost of fuel, water, labor, etc.

Most modern central stations should be able to compete with the isolated power plant where the total connected load is less than 100 H. P., even in cases where the purchaser of power would have to provide independent apparatus for heating.

Assuming that the purchaser has decided to build a power plant and does not control a natural water power, he first considers his prime movers, or engines, and decides between steam, gas, oil, etc.

The steam engine and boiler are, of course, the best known to the average buyer, and have been so thoroughly tested that he is inclined to decide at once on steam, notwithstanding the much higher efficiency offered by the gas engine and oil engine builders.

Of the engine systems other than steam, we have to consider the suction producer system, using anthracite coal, coke, or charcoal for the purpose of making gas; the pressure producer, using bituminous coal or lignite; the oil engine of the Diesel type; the gasoline engines, etc.

Power plants equipped with suction gas producers have recently been installed in localities where the price of bituminous coal is excessive. In some of these plants charcoal is prepared from wood and is then converted into gas in the suction gas producer.

Small plants throughout the United States have been equipped with suction gas producers and gas engines. In most cases these engines have a capacity of less than 100 H. P.

Gas engines are also found in considerable numbers operating small plants in places where natural gas is found.

Small gasoline and kerosene engines are much used by farmers for pumping water and driving farming machinery.

The crude oil engine of the Diesel type has long given promise of high efficiency, and has shown in tests a thermal efficiency of 30% or better. A number of these engines have been installed throughout the United States in localities where crude oil can be obtained at a low cost.

This type of engine is known as a combustion

engine, crude oil being sprayed into the cylinder and ignited from the temperature resulting from high compression.

For general comparison of the above mentioned types of prime movers, it may be said that the average modern steam plant equipped with condensers and economizers gives an efficiency of about 10%—this being the ratio of work produced at the engine shaft to the equivalent heat units contained in the coal supplied to the boilers.

Without condensers or economizers, the average small plant in common use will show an efficiency of about three-fourths the above amount.

In the case of the gas producer and gas engine, a maximum efficiency of 22% is frequently obtained

For comparison of first costs, it is estimated that the cost of a complete gas engine plant, including producers, engines and auxiliaries, is practically the same as the cost of a complete steam engine plant, including boilers, piping, reciprocating engines, condensers and all auxiliaries.

Great progress has been made during the past ten years in the development of the gas engine, and engineers will, without doubt, give more careful consideration to the claims of gas engines in the near future.

The principal objections to gas engines in the past have been the difficulty of obtaining uniform angular velocity, the inability of the engines to carry overloads, also the fact that most operating engineers are more familiar with steam engines and can maintain them with more certainty.

Coming back to the steam engine plant, the engineer, having decided to install a steam power plant, is now confronted with the problems pertaining to the same. The number, size and type of boilers; the proper arrangement of boilers; the number and sizes of engines or turbines; if engines, whether Corliss type or automatic, high speed; the proper speed of engines; whether to operate condensing or non condensing; whether to use electrical transmission of power or drive by belts or rope from main shaft, and many other details which must be worked out before the plans will be complete.

In working up plans and specifications for such a plant, the engineer should have all the time possible for making his plans, as much time and money can be saved in the engineer's office and drafting office by first solving the problems on paper and not waiting until the difficulties arise, only to find that much work must be undone in order to successfully complete the plant.

In many cases the engineer is able from his experience to quickly and accurately arrive at his general conclusions without making detailed calculations of a number of methods.

The first work to be done is to learn the load conditions, the maximum load, minimum load, and average load for the twenty-four hour period, and also to consider the possibility of future extensions.

In the case of factory design, the next point to consider is the proper method of driving machinery, whether by motors or by shafting and belts.

The method of driving by electric motors is very popular in our times, and it may be safely stated that the motor drive method will be used in all cases where the combined cost of dynamo, motors and wiring is equal to or less than the cost of line shafting, belting, etc., and in a great many cases where the cost of electrical equipment exceeds by as much as 50% the cost of shaftting. In central station work and office building work, the power plant is necessarily electrical.

Assuming that the electrical transmission of power is found to be advantageous from point of first cost and efficiency, there is to be determined the proper characteristics of the dynamos and motors, whether direct or alternating current will be employed, and the most desirable voltage to adopt.

For most office buildings in the downtown districts in cities, direct current of 125 or 250 volts is generally employed for operating the lighting, elevators and motors.

For factory work, the 250 volt direct current system is used to advantage, using a balancing set for lighting, but in many special cases for

factories, it is advantageous to install the alternating current system, using 220 volts or 440 volts.

Most central stations for towns of 4,000 population to cities of 40,000 population use alternating current, 2,200 volts, two or three phase.

The question of the proper current and voltage cannot be answered except when all conditions of service are known and carefully considered.

After determining the electrical features of the plant, the size and type of engines and dynamos are to be determined.

For the average central power station it is advisable to adopt a standard size unit suitable to the installation, and to provide in the design of the plant for future extension of the engine, dynamo and boiler house equipment.

For factory power plants the size and number of units cannot be determined without knowing the kind of plant and the conditions pertaining to same.

If reciprocating engines are decided upon, the question arises as to the advantages of Corliss type engine against automatic high speed engines, and of direct connected dynamos against dynamos of the belted type.

In many cases the question of belting as opposed to direct connecting is answered by the fact that it is cheaper to pay additional money for direct connected engines and dynamos than to provide floor space and extra cost for building necessary for the belted type. In any case, the writer's experience has been that the direct connected type of engines and dynamos is preferable when cost is not prohibitive.

As to the type of engine to be installed, there are many arguments for and against each of the above types. The writer's practice has been, when installing direct coupled reciprocating engines, to recommend the Corliss type for driving dynamos of 200 K. W. capacity or larger; for driving direct coupled dynamos of size from 75 K. W. to 200 K. W., to recommend a modern first-class four-valve automatic engine with flywheel governor; and for units of less than 75 K. W., to recommend a single valve automatic engine.

For engine speed, the piston travel should be approximately 600 feet per minute, and the cylinders designed to give about 100 R. P. M. for Corliss engines, between 300 and 800 H. P. for simple engines, and somewhat less for compound engines of the larger size.

The cylinder of the four valve engines to be proportioned to give a speed ranging from 225 R. P. M. for an engine of 125 H. P. capacity to about 180 R. P. M. for an engine of 300 H. P. capacity.

The single valve automatic engine to operate at a speed of 275 R. P. M. for 100 H. P. capacity and revolutions per minute to be increased to 325 R. P. M. for an engine of 40 H. P. capacity.

The engine selected should be capable of operating the dynamo which it drives at full rated load when operating at the most economical point of cut off.

The conditions under which the plant operates will decide in a good measure whether the engines will operate condensing or non-condensing. In a locality where water is plentiful and cheap and fuel is high, also where the load factor is high and fairly uniform, the operation of condensing engines should prove profitable. For a rough method of determining the advisability of operating a condensing plant, estimate the pounds of coal which the plant will consume per year when using simple non-condensing engines. Then, providing the load conditions are uniform and that plenty of water may be secured, simply by pumping against a low head, take 15% of the yearly fuel bill and compare this amount with the fixed charges against the condenser with its piping and all auxiliaries, these charges to include 6% interest, 8% depreciation, repairs, labor for maintenance, etc. If the saving in fuel shows a profit of 10% net on the cost of the equipment and no other conditions interfere with the operation of the plant operating condensing, then the condensing apparatus may be installed profitably.

It is generally found, however that a power plant must have a capacity of more than 200 K. W. to operate condensing with profit.

In many cases it is profitable to operate condensing where water is not secured cheaply, and under such conditions it is advisable to install cooling towers circulating the water over and over again through the condensers after same has been cooled in the cooling towers. The evaporation of water in cooling towers will average about 10 per cent. of the total circulating water, and as this amount is saved by operating condensing, the total quantity of water used when running condensing with cooling tower is practically the same as when running non-condensing.

One advantage of operating condensing that should not be overlooked comes from being able to supply the greater part of the boiler feed water with condensed steam. This prevents a large proportion of scale in the boilers in most cases and reduces the boiler maintenance and increases the average boiler capacity.

In considering the prime movers, the question of steam turbines as opposed to reciprocating engines is presented. The steam turbine finds great favor with the large central stations where it is desirable to concentrate a large capacity into limited space. The efficiency of steam turbines is generally considered somewhat higher than that of reciprocating engines, and the first cost and maintenance somewhat lower. The turbines in general use, however, are units of capacity of 400 K. W and larger, and in order to obtain the best economy it is essential that they be operated condensing.

Boilers. After deciding upon the engines, the boiler plant is designed.

The types of boiler in general use are the water tube boiler, the return tubular boiler, the internal fired boiler, or marine type, and combinations of return tubular boilers and water tube boilers. When conditions permit, it has been the writer's practice to recommend the use of the water tube type of boiler for sizes above 200 H. P., and the return tubular type for sizes under 200 H. P.

Where return tubular boilers are used, same should be installed with iron columns and steel beams, making a supporting frame for suspending the boilers independent of the brick setting.

The best practice allows 10 square feet of heating surface per rated horse power for water tube boilers and 12½ square feet of heating surface per rated horse power for return tubular boilers. One rated boiler horse power is equivalent to the evaporation of 34½ lbs. of water per hour from feed water at 212° F. to steam at 212° F.

The simple non-condensing Corliss type of engine consumes about 26 lbs. of commercial dry steam per indicated horse power hour. The average simple four valve automatic type of engine consumes about 28 lbs. of commercial dry steam per indicated horse power hour. The simple automatic single valve type of engine consumes about 36 lbs. of dry steam per indicated horse power hour. The compound Corliss type of engine operating non-condensing consumes about 22 lbs. of commercial dry steam per indicated horse power hour. The compound Corliss type of engine operating condensing with 26″ vacuum consumes about 16 lbs. of dry steam per indicated horse power hour.

The figures of steam consumption represent results obtained from the average engine operating under full load conditions.

Having determined the total boiler horse power required, arrangements should be made in the design for additional boiler capacity, so that the plant can be operated at all times with the additional capacity idle in order that the boilers may be kept in the most efficient condition at all times. For example, if it is found that the maximum load is 600 boiler horse power, it would be good practice to install three units of 300 H. P. each. In case the maximum load is 150 boiler horse power, then the two units of 150 H. P. each would be installed to advantage.

In connection with the boiler plant design, we have to consider smoke stack as opposed to induced draft, also the kind of stack, the furnace design—that is, whether plain grate bars or shaking grates will be adopted, if automatic stokers will be used, and the character of same. We have also to consider the method of handling

coal, the feed water heater, fuel economizers, the boiler feed pumps, and any number of automatic devices, such as pressure regulators, automatic weighing devices, etc. For the moderate size plant—that is, up to 1,000 H. P. capacity—the smoke stack will, no doubt, be used for some time to come, but mechanical draft is used in connection with stacks in many of the large plants. For smoke stacks we have a choice between the guyed steel stack, the self-supporting steel stack, the brick stack, and the reinforced concrete stack.

A good brick or reinforced concrete stack will, no doubt, prove in the end a good investment and adds greatly to the appearance of the plant.

For furnace design of the small return tubular boilers, the writer's practice has been to use either plain grate bars or shaking grates, and in cities where smoke prevention ordinances are enforced, or smoke is objectionable, to equip boilers with down draft furnaces or other smoke preventing device.

In the bituminous coal district, where fuel is low in price, slack coal and screenings can be burned to advantage with furnaces equipped with automatic stokers. Stokers of the chain grate type, underfeed type, and the inclined grate type are all suitable for such service, and in the writer's opinion are economical.

In regard to coal handling device, would say that the boiler plant should have a total capacity of not less than 1,500 H. P. before machinery for handling coal will prove to be economical. A common coal handling device consists of a track hopper built for dumping cars, or so constructed that coal may be shoveled from cars. From this track hopper, the coal is conveyed either through a crusher or around same, and hoisted up into coal bins by a conveyor. These coal bins are equipped with slides operated from fire room floor so that the coal may be discharged into the hoppers. Plants equipped with boilers provided with automatic stokers and the above arrangement of coal handling machinery may be handled with very little labor.

Regarding feed water heater, the practice in the vicinity of St. Louis has been for some years past to use an open type of heater equipped with trays and automatic valve for allowing cold water to enter the heater. The exhaust steam comes in contact with the water to be heated as same flows over the trays, and feed water in this way can be introduced into the boiler at an average temperature of 200° Fahr.

In regard to fuel economizers, the plant must be of sufficient size before economizers can be installed to any great profit. In the writer's judgment economizers are used to best advantage in power plants having boiler capacity of 1,000 H. P. or greater. The fuel economisers and feed water heater combined should give a saving of approximately 25 per cent. of the fuel which would be burned without these devices being installed.

When condensing apparatus is used, it is customary to return the condensed steam to the feed water heaters, and thence to the boilers, and to heat the condensed steam in the feed water heater by means of the exhaust from all the auxiliary apparatus, such as boiler feed pumps, condenser pumps, water pumps, etc. For boiler feed pumps, pot valve plunger type, outside packed, pumps with bronze plungers are much used and give good satisfaction.

There a number of refinements for boiler plants which may be considered, such as automatic pressure regulator and feed water regulator, also autmatic weighing devices by which we can record the total amount of coal consumed in the furnaces, also an econometer for recording the quality of flue gases.

Where hand firing is adopted, the boilers should be properly placed to allow for storage of coal, and also space should be provided either in front of the boilers or in the rear of the boilers for removing and replacing flues or tubes.

It is customary to locate the boiler plant so that same is located on railway switch, and to have coal windows provided in the boiler house so that coal may be unloaded from cars into the boiler room.

The arrangement of pipe work for properly

connecting the boiler plant with engines and auxiliary apparatus, also pipe work for connections between engines and condensers should be given careful study.

As a rule, where a plant is equipped with two or more boilers, a boiler header is provided with ends left blank for future extensions and connections between the boilers and header and between the engines and header are made with pipe bends, and provision is made for contraction, expansion and drainage.

An arrangement is generally made so that all condensation in the pipe line will accumulate in the boiler header, which is drained by means of suitable trap, and condensation discharged into feed water heater. Each engine is also provided with a steam separator which collects condensation, which is also discharged by means of a trap into the feed water heater.

In connecting between engines and condensers, care should be taken to avoid bends and other obstructions as much as possible.

The live steam pipe should be covered with non-conducting material, preferably 85 per cent. magnesia. Exhaust pipe, as a rule, is not covered, but is laid in a cement-lined trench having cast iron covering plates.

The type of condenser to use depends upon the amount and quality of water available for condensing purposes. The surface condensers offer the advantage of returning condensed steam to the boilers without being mixed with circulating water.

The auxiliary apparatus used with the surface condenser consists of the air pump, small water pump for returning condensation to the hot well, and circulating pump for the purpose of circulating condensing water through the condenser.

The jet condenser has the advantage of lower first cost, and less space occupied, but has the disadvantage of mixing fresh water with condensed steam, which may introduce substances injurious for boiler feed purposes.

The switchboard and cables are included in the design of electric power plants. As a rule the cables connecting the dynamos and switchboard are lead covered, of sufficient insulation for the conditions, and are placed in conduit or tile under the floor line.

The matter of switchboard design depends almost altogether on the conditions under which the board is used. It is customary to allow one switchboard panel for each dynamo, and in case alternating current is used, to provide one switchboard panel for direct current exciters and allow one switchboard panel for two circuits, thus making the number of panels used depend upon the number of individual circuits running from the engine room.

In the preparation of the specifications descriptive of the machinery going to make up a complete power plant, it is well to decide beforehand as closely as possible on all points, such as the type of engine to be employed, the exact speed at which same shall operate, the exact capacity for boilers, the type of boiler, state the rating in square feet heating surface per horse power, describe in detail method of setting; in other words, to describe with as much detail as possible, and, at the same time keep within the limits of standard commercial practice. By preparing the specifications in this manner, all bids will be much more uniform and to the point and will save much time in tabulation and comparisons, and, as a rule, will secure better competition on the apparatus purchased.

In the design of a power plant, the mechanical and electrical engineer should arrange for proper lighting, heating and ventilation of the power plant and arrange for ample space for the proper placing and operation of the equipment, also allow ample room for making the necessary repairs, and should see that the power house design is attractive to the eye and well constructed throughout.

While it is difficult to figure where the return upon the investment comes in by installing tile floor and enameled brick walls and finished ceiling in the ordinary engine room, the writer is of the opinion that the money is well spent, for the reason that the average engine room attendant will take more pride in properly maintaining the

apparatus under his charge when same is placed in a finished and attractive building.

HEATING. In connection with the design of a power plant for an office building or factory, the question of heating must be carefully considered by the engineer.

The heat units which become "by product" in the manufacture of a horse power hour by an internal combustion engine are considerably less than when a horse power hour is developed by a steam engine. For this reason no extensive heating plants have been constructed to utilize the waste heat from gas or oil engines. There is, however, nothing impractical about using the exhaust from a gas or oil engine in connection with a hot water heating system when the capacity requirements of the heating system will permit and the operation of the engines is continuous.

When heating apparatus is installed in connection with steam engines, the heat is transmitted by three general methods.

First; Exhaust steam is carried through pipes, at low pressure, directly to the coils or radiators.

Second: Water is heated while passing through tubes surrounded by exhaust steam in a heater, then circulated through the radiators.

Third: Exhaust steam is carried through pipe coils and air is heated while being forced around the coils on its way to registers located in the rooms to be heated.

The apparatus may be installed most cheaply by the first method, but to insure positive circulation, the engines must be operated against an undesirable back pressure, unless a vacuum pump is provided to maintain a partial vacuum in the return pipes from the system. The use of a vacuum pump necessitates the attachment of a float or thermal valve to each coil or radiator. Modifications in the design of these special valves are the distinguishing features in the several "vacuum" heating systems in present use.

The heater used with the second method is usually so designed as to impose little or no back pressure on the engine exhaust and no vacuum pump is needed.

With the third method, a vacuum pump may be attached to the air heating coils where lowering of the exhaust pressure is of sufficient importance.

ALUMNI NOTES.

The St. Louis Rose Tech Club had its regular monthly meeting and dinner at Lippe's Restaurant, Wednesday evening, March 4. Those present were Benbridge, '06, Hatch, '06, Austin, '07, Crockwell, '95, Hendricks, '85, Kellogg, '03, Kessler, '97, Langman, '92, Wells, '96, and Wiedemann, '03.

Harry D. Baylor, '07, formerly with the Minneapolis Gas Co., is now with the Louisville Cement Co., Sellersville, Indiana.

Carl W. Wischmeyer, '06, has left his position with the Bethlehem Steel Co. of South Bethlehem, Pa., and is now located at Louisville, Ky.

Frank A. Delle, Jr., '06, has been working recently at East Liberty, Pa., installing refrigerating plants. He is in the employ of the York Refrigerating Co.

H. E. Shryer, '05, is at present at Pittsburg, Pa., being still in the employ of the Ameriean Steel and Tin Plate Co.

The engagement of Victor K. Hendricks, '86, to Miss Sue E. Ross, of Terre Haute, has been announced. The wedding is ts take place on May 28th.

Cards have been received announcing the marriage of Miss Ethelind Adna Spendley and Gustave A. Maier, '00, at Wilkes-Barre on April 8th, 1908.

MODERN LOCOMOTIVE SERVICE.

By H. W. HEIDENGER, '08.

AS very few of the persons who take advantage of the opportunities for quick travel presented by modern railway service, realize the great amount of work and care which is required to keep a locomotive engine in condition for constant and efficient service, this article will be written not from a technical point of view, but merely as a reminder to those who fail to observe anything more in railway service than that it is a convenience with which they could hardly dispense.

The best starting point will perhaps be with the arrival of the locomotive at its terminal station. By terminal station, in the case of a passenger engine, is meant the passenger depot in the city at which the engine completes its run, and is put into shape to make its return trip; in the case of a freight locomotive, the freight yard office. Formerly it was the custom to employ men whose duties were to relieve the engine crew on their arrival at a terminal station, to clean fires, supply coal, water, sand, etc., to the engine and deliver the locomotive to the repair men in case repairs were needed. Then at the time when the engine was due to make its return trip, these same men delivered it to the engine crew at the station. In modern practice, however, this custom is not generally followed, but the engineer and firemen themselves are required to take the locomotive to the round house track, or some place supplied for this purpose. On their arrival at the engine house track, the crew must see that the engine throttle is closed properly, plenty of water in the boiler, a good fire in the fire box and the reverse lever in central position. This latter is very essential, as serious accidents have occurred from engines running away and if this precaution is taken there is no possibility of such an occurrence. In cases where each crew has its own oil cans, tool boxes, lanterns, water cans, etc., it is generally the duty of the fireman to see that these are properly taken care of, and then his duties are ended. The engineer, in the meantime, has thoroughly inspected all parts of the engine which he can see or feel without getting underneath it. He is now obliged to make out a complete report (on a special blank) of the condition of the engine on arrival, any defects which have been noticed while on the road, all repairs which he thinks are necessary, etc. In some cases he is also required to account for any delays which may have occurred, and also for all oil, coal, supplies, etc., which have been used on the trip. This engineer's report is delivered to the round house foreman, whose duty it is to see that all suggestions as to repairs or condition of engine are given proper attention, and that the engine is put into shape to resume service. After the repairs have been made the foreman marks the report "O.K.," "complete," or some similar designation, and the report is sent to the master mechanic. By this means a check is always kept on the condition of the locomotive, the skill with which enginemen accomplish their runs, expenses of engine for each trip, and the manner in which the workmen in charge of the repairs do their work.

The engine having been abandoned by the crew, falls to the care of the "hostlers." These hostlers clean fires, put coal, water and sand on the locomotives, and deliver them to the roundhouse. This work requires on an average from half an hour to an hour per engine, depending on the conditions under which the men work and the conveniences with which they are supplied. The hostlers are paid from 20 to 25 cents an hour.

The engine is generally delivered to the roundhouse with a steam gauge pressure of from 50 to 100 pounds, but with no fire in the furnace, except in cases where the locomotive has to resume service in a very short time. The roundhouse is so designated on account of its shape. Most roundhouses are circular or segmental in form, although this is not altogether the practice. A building of circular shape offers several advantages: in the first place, a space in the center must

be utilized for a turntable on which the locomotives may be made to face in any desired direction. These turntables of late years have become very large, to accomodate the large modern engines, and being of necessity circular in form, they can be built in the center of a circular house without taking up more floor space than is necessary. Since the size of engines and turntables has materially increased lately, it is now found necessary to drive the latter by means of electric or air motors; secondly, the tracks or stalls may be put radial in a circular building, thus utilizing a minimum of space and still leaving plenty of room at the rear between the tracks for the workmen; also, a circular building may be erected on a given floor space and afford more stall room than a building of any other shape.

The engine having been delivered at the round house by the hostlers, is immediately inspected thoroughlyby boiler and engine inspectors, in case men are provided for these duties, as they are in most modern shops. The boiler inspector examines the flues, grates, firebox, staybolts, boiler sheets and all parts subject to the boiler maker's care; he then either gives his orders to the boiler makers under his charge or makes a report to the foreman, who orders the work done. Most of the boiler maker's work is done in the firebox while the engine still carries steam, and it is a common thing to see a man working inside a firebox so hot that one can hardly bear to touch it; forced draught is used to enable the man inside to withstand the heat. Whenever possible, boiler work is done while the engine is hot as repairs can be made much more effectively. However, boiler work is divided into two classes, "hot" and "cold" work, and if enough men are employed, they are generally divided into "hot" and "cold" workers. The average boilermaker's pay is from 32 to 35 cents an hour.

After the boilermakers have finished their work, the engine is given over to boilerwashers, mechanics and other workmen. The steam and hot water are gradually let out of the boiler so as to cool the boiler as uniformly as possible, and not too rapidly, as quick cooling causes contractions which are injurious to the boiler and which cause leaks. Then the boilerwashers run water under high pressure, (city fire pressure) through "washout plugs," thus removing the scale and sediments which have formed in the boiler.

Formerly it was necessary to wash the boiler of a locomotive every other trip to keep the engine in first class steaming condition, but since the introduction of various boiler compounds of which soda-ash (a crude form of sodium carbonate) is one of the most common, it is found that an engine may run for a considerable length of time without washing out, so that merely a change of water to remove oils, etc., and thus prevent foaming and priming, suffices. To wash a locomotive boiler thoroughly requires a half or three-quarters of an hour after the hot water has been let out. The boilerwasher's pay is only about 20 cents an hour, which is very small, considering that the work is very disagreeable, and that he is always exposed to the water and liable to rheumatism; very few boilerwashers follow the trade for any considerable length of time without contracting that troublesome disease.

In the meanwhile, the mechanics and other workmen are completing their work. The mechanic encounters such duties as filing connecting rod brasses, piston rod, valve stem and cylinder packing work, eccentrics loose and wedges to adjust, cab valve packing to be repaired, injector and lubricator repairs, and replacing or repairing all broken or worn parts. The mechanic's work is generally divided into the two classes running repairs and "dead" work. Running repairs include all such work as may be done in a short space of time, that is, work which does not require the laying off of an engine for a day or more. The work named above comes under this class. "Dead" work includes those duties which require that the locomotive be laid over for a considerable space of time. Valve setting, valve facing, cylinder boring, fitting new brasses, lining up of guides and pistons, tire setting and general overhauling are included in this class. In some shops gangs of men are kept separately for each class of work, while in others all the mechanics

employed work on the running repairs, and as soon as they have finished these duties resume the "dead" work. A skilled mechanic should be able to work on both classes. The union mechanic's pay averages 34 cents an hour.

The "other workmen" mentioned above include those who take care of headlights, engine supplies, etc., those who make the repairs on tenders and who replace wheels, and carpenters and engine wipers. Necessarily a great variety of supplies, duplicate parts, lanterns, tools, bolts, nuts, etc., are required in a large shop, so that a storeroom is generally kept in conjunction with the round house and shops. From these store rooms almost every conceivable object may be obtained, some of very great value. In a carefully directed shop it is difficult to obtain any supply, no matter of how small value, without considerable red-tape.

Any one who has had any experience in a railroad round house knows how disagreeable a place it is to work in; always greasy, grimy, filled with suffocating smoke and with debris, and in the winter with escaping steam, built in most cases so that one must almost always work by torchlight, it is very hard to get workmen to stay for any length of time unless affairs are very carefully managed. In a round house the men are required to be on duty Sundays, holidays and every day, and at no time is the place left deserted. Also, most enginemen have their superstitions, prejudices and pet hobbies, so that as a rule they make things as unpleasant as possible for the workmen.

Returning to the locomotive, we will assume that the engine has been put into proper running condition, and has been called for service. The foreman notifies the firing up man to get the engine ready for its crew. He proceeds to start a fire, first making sure that there is plenty of water in the boiler. The grates are first covered with a layer of coal, and then a fire started on top of the coal, either with oily waste and wood, or with oil-soaked shavings. Forced draught is used, and by carefully building up the fire, the engine is gradually heated and steam is raised. With careful handling, an engine may be perfectly cold to start with and a steam pressure of 100 pounds attained in about an hour.

In the meantime the engine crew has arrived. The fireman's duties are to see that all the oil cans, lanterns, tools and supplies necessary are brought to the engine, and that everything in the cab is in a clean condition. The engineer must see that all oil cups and oil-using parts are properly attended to, and that the engine is completely "oiled around." He should also thoroughly inspect all parts of the locomotive possible, to see if any defects which may have been reported have been properly taken care of. The engine is then taken to the terminal station, once more oiled around, and is ready for its train.

After an engine has been in service for a considerable time, it is found impossible to remedy the defects without a general overhauling. Formerly the life of a boiler and its tubes was about a year, and since at the end of that time all the tubes and boiler fixtures had to be removed, it was found convenient to repair the engine parts at the same time. Since the installation of water-softening plants, the flues and boiler last from three to six months longer than formerly, so that an engine now remains in service about a year and a half, and sometimes longer, before being sent to the "back shops" for a general overhauling. When an engine goes into the back shop it is stripped completely, even to the smallest bolt, and then carefully rebuilt, part by part, such parts as having been broken or worn being replaced by new ones. A back shop overhauling requires from a month to two months, and a recently published article gave the cost of repairs and labor on a Mallet Articulated Compound, having been in service for a year and a half, as about $1,100. An ordinary engine would not cost more than one-half or two-thirds of this amount for complete general repairs.

AN APPRENTICE TRAINING CRUISE IN THE U. S. NAVY.

By ROBERT J. TEMPLETON. '11., Ex-Apprentice U. S. N.

ALMOST every truly patriotic American boy has at some time during his life a desire to serve his country, either in the army or navy, but not a very large per cent. realize this desire.

From early childhood I was much interested in our navy, which was then small compared to what it is today. During the spring of 1902, school life seeming very dull to me, and knowing that I was old enough to enter the navy as an apprentice, 3rd class, the age requirement being from 15 to 17 years, I secured the unwilling consent of my mother, she seeing that I had set my head on getting a naval training. On May 14, 1902, I enlisted at Chicago, and was sent from there to the naval training station at Newport, R. I., where my real Jack-tar life began. There I was taught the first rudiments of a seaman's life.

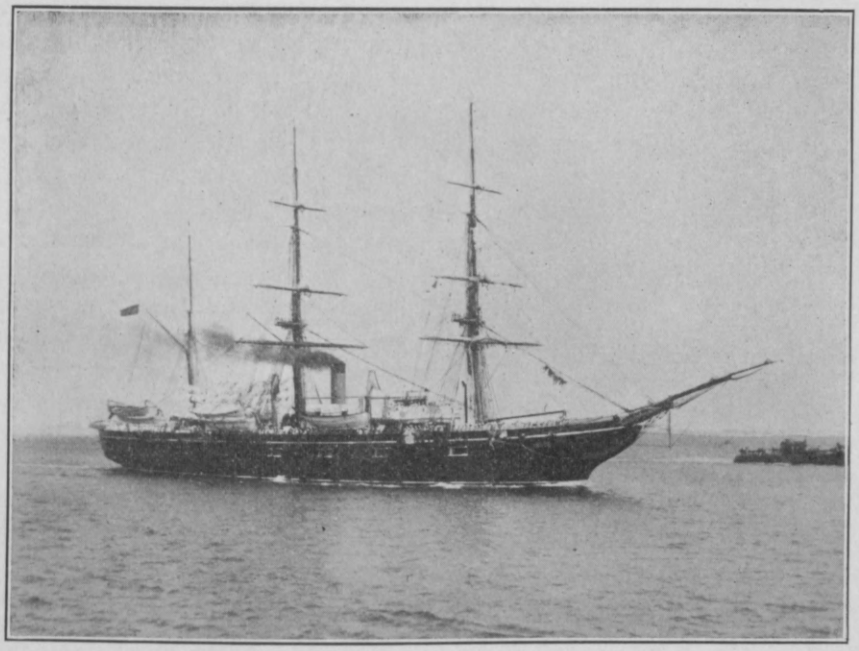
I was not long in finding out that the navy was no place for idleness, but a place of continual work and study. After receiving my various uniforms and a hammock, I was at once taught to tie the numerous kinds of knots and to learn their names, and how to splice. I was then taught to box the compass, to heave the lead, the parts on an anchor, the signal code and the wigwag, the parts of a ship, masts, yards and sails, boat-drill, both rowing and sailing, infantry and artillery drills, and numerous other things which a sailor must learn and learn well.

After about four months' training at the station I was transferred to the U. S. S. Hartford, at New York, then used as a training ship for apprentices. The Hartford was Admiral Farragut's flagship during the Civil War, and has a history worth looking up. There were about three hundred apprentices on the Hartford, all anxious to see some real sea life.

The Hartford is fitted up with both steam and sails, and was considered the best of the three training ships we had in the Atlantic, the other two being the Essex and Monongahela. After leaving New York we steamed to Washington, then to Norfolk, Va. We were in Washington at the time of the G. A. R. Encampment, and were allowed shore leave, so that all of us had a chance to see our beautiful capital. We also made a big parade there and were reviewed by Admiral Dewey.

After coaling ship at Norfolk, we left immediately for the Madeira Islands, which are located near the north-west coast of Africa. I can well remember the feeling which came over me when we were bidding farewell to the land we loved so well. As soon as we had put to sea, it being a little rough, nearly every one of us became seasick, I being one of the number, and everyone knowing what seasickness is will agree with me when I say that it makes a person feel most awfully downhearted. In fact, I didn't care for anything; if the ship had been sinking, I would have said, "let her sink." This did not last very long, however, with the most of us, and in a day or two we were ready for the hard training which we were to receive on the way across. Our course was southeasterly, and it was not long before we were in a warm climate, where we discarded our shoes and put on our spotless white suits. Our watches while at sea were four on and four off, with the dog watches from 4 to 6 and 6 to 8 P. M., a bit hard on us at first, resulting in considerable discontent. During watch our orders were to stay on deck, rain or not. We were supplied with those guaranteed never-leak oilskins, but I guess that the person who said that they would not leak never was so unfortunate as to wear any; at any rate, when it rained we figured on an extra fresh-water bath. On our way across we were given numerous drills at making sail, reefing and furling, acting as helmsman and leadsman; and had plenty to keep us busy. Besides, we had to scrub our own clothes and scrub them well, for cleanliness is always marked in a good sailor, and when lined up for inspection every morning, we certainly made a good showing. After being at sea for over two-

thirds of a month, land was sighted on our starboard bow, and I don't believe that a bit of dirt ever looked so good to me in all my life as it did then. We found that we were off the Azores Islands, and after steaming for some distance we put into Porta del Garda, where we took on more coal, our coal supply having run short, as we had hurried the latter part of our trip somewhat by steaming. After coaling, we proceeded on our short journey to Funchal, one of the principal cities of the Azores group of Islands. It is situated on the Island of Madeira.



U. S. S. Hartford, Training Ship.

Madeira is very mountainous. Approached by water, it affords possibly one of the most beautiful sights to be found in the world. The white houses of the town, with their bright yellow roofs, and the churches and villas, are half hidden by palms. The climate is soft, balmy, almost tropical, and months pass without a rainy day. The population of Madeira is about 140,000. It seems to be a disputed point as to who really discovered and named the island; by some writers Zargo is given the credit of discovering the lovely Ilhada Madeira, or Island of the Wood, which he so named because of the timber covering it. The natives are very dark complexioned; they are not true Portuguese, at least the lower classes are not, being an intermixture of African blood. They are also reported to have an intermixture of Moorish blood.

While at Funchal much liberty was given, and we had plenty of time for sight-seeing. One of the oddest sights we saw there was the mode of travel, which made all of us feel as though we were living back in the 15th century. There were no horses or wagons, but oxen and sleds, which were drawn over the small moss-covered stones, which formed the paving of the streets. After spending a few weeks at this most interesting place, we put to sea, our next port being Algiers, which is situated on the northern coast of Africa. This place seemed much more civilized, some parts of the city being quite modern and having good electric car service. Algeria is a French possession, and we found that the French language was spoken by almost everyone. A large

portion of the city is taken up by Arabs, the men being dressed in white Zouave-looking suits, and the women wearing veils covering the face below the eyes. This was very interesting to us, and I was extremely fortunate in getting to talk to one of these Arabs who had been to the Chicago World's Fair, and could speak very good English.

After staying some time at this place, we proceeded on our way to Piraeus, Greece, passing through the Strait of Messina. Piraeus is the seaport city of Athens. This city, which is only a few miles from Piraeus, was one of the most interesting places we were to visit while on our cruise. A party was gotten up by our chaplain for a trip to Athens, and we were given twenty-four hours to see all we could, and I believe that I saw more in those twenty-four hours than in weeks in other places. The most important sights were the king's palace, the Acropolis, the Stadium and Temple of Theseus. While at Piraeus we were paid a visit by the king and queen of Greece, who seemed to enjoy it immensely. I don't believe that I shall ever forget this visit, for I came nearer freezing that day than I ever did elsewhere, as we had to man the yards and rail, a tribute which is paid only to the head of a country, and it was bitter cold out on those yard-arms.

Our next port was Villa France, France. On our trip there we passed the volcanic Mount Stromboli, which is an island, about sunset, and it was one of the prettiest sights I ever saw. The red molten lava poured down the side of the mountain, looking like a river of fire, something I had never dreamed to be possible. During our long stay at Villa France we were given plenty of drill, especially in sailing boats and sail drill aboard ship. The climate was excellent there and our stay was one of much pleasure. We were given plenty of shore liberty, and could see the many places of interest, most of us usually going to Nice, only a short distance from Villa France. From this place we were to have gone to Alexandria, Egypt, to visit the Holy Land, but because of some epidemic which was there at that time we lost one of our main points of interest.

From Villa France we sailed for Marseilles, France, which is the main coastal city of that country. Here we were given a good opportunity see what a good-sized French city is like, but from my recollections I don't believe I would want to live there, for I had at that time found out that there is no place like the U. S. We next proceeded to Gibraltar, one of the most wonderful places in the world. I was not fortunate enough to receive any shore leave at that point, but from our ship in the harbor I was able to see almost all of the rock, which is an immense fortress. From this point one can see several different countries. Our next voyage was back to Madeira, and then "all hands make sail for home." My, but that did sound good. I don't believe I ever saw a happier bunch of boys in all my life. In making our trip back we followed in the path of the trade winds as much as possible, so that we could depend largely upon our sail. The voyage was a pleasant one, and I am sure long to be remembered by our crew. We were about half way across, when one evening at about seven bells (7:30 o'clock) all was peaceful and the ship's band was playing on the quarter deck, a rocket was seen by the lookout on our port beam. Orders were at once given to leave our course and proceed in the direction of the rocket; everything was made ready to assist what was thought to be a sinking ship; lifeboat crews were ready to drop lifeboats, and all possible speed was made in the direction of the rocket. After we had reached the ship which we had thought to be in distress (an old sailing ship), our captain inquired if we could be of any assistance, but strange to say they in turn wanted to know if they could be of any assistance to us. We soon found out they had thought our ship was afire, the lights which were used by the band making it look so. After inquiring each other's destination we gave them three cheers, and they in turn gave three for us. We then directed our course again homeward.

We arrived in San Juan, Porto Rico, in the latter part of March, 1903. Here we were made apprentices, 2nd class, and awaited our transferal to Norfolk. From Norfolk we were given furloughs and a chance to visit our homes before taking up our duties in the general service.

Throughout all my naval service, which was four years and seven months, I never forgot the training we received and the sights we saw on that training cruise in the Mediterranean.

Harvey H. Meadows, '96, spent several days in Terre Haute in the latter part of March.

Arthur F. Gordon, '97, was in Terre Haute for a few days early in April.

O'Brien, '09, (in machine design room, mistaking Prof. Peddle for Frisz): "Go on, says I."

Prof, Wilmarth, (about to deliver a lecture in shop): "I wonder where my audience is?"

Bogran: "Here it is."

H. Blair Pettit, '03, was in Terre Haute for a short time on April 3rd, on his way back to California after a short visit in Kentucky.

The New York Rose Tech Club held its third annual dinner on April 4th, at Healey's, at Sixty-sixth street and Columbus Avenue, New York. Dr. Mees made a trip to New York to be present at this occasion.

A recent item in a Terre Haute paper is to the effect that Donald McDaniel, '07, will be married on April 19th to Miss Bonnie Davis of Winchester, Ind. Congratulations to Mac, and may he live long and prosper!

R. A. Strecker, '07, is engaged in laying out the lines for an interurban railway between Casey and Mt. Carmel, Ill. With him on the work are G. F. Nicholson, '06, O. F. Reynolds, '05, and J. F. Regan, Jr., '04.

The Seniors have decided that the class trip this year shall be to St. Lonis. A cordial invitation was received from the St. Louis Rose Tech Club, and the men of the class expect to spend a few days very profitably and pleasantly. The trip will take place early in May.

SCIENTIFIC SOCIETY.

On March 20th, the Scientific Society was addressed by E. J. Fischer, on the subject of the manufacture of wooden vehicle wheels. The principal types of wheels in use were described, and their differences noted, after which Mr. Fischer gave a very interesting description of the process of manufacture, from the time when the timber is cut, through the treatment in the dry-kilns and the handling received in the modern machines which shape the parts, to the final finishing of the assembled wheel.

At the close of the address, Mr. Fischer was tendered a vote of thanks by the Society.

SYMPHONY CLUB CONCERT.

The concert given by the Symphony Club on March 24 for the benefit of the Athletic Association, was a great success, both artistically and financially. All the numbers were faultlessly rendered; the Glee Club graciously responded to prolonged applause with several encores, and Mr. Wanner played a 'cello solo which was not on the program and which was a musical treat.

The program was as follows:

PART I.

1. Miss Dolly Dollars—Selections . . . Victor Herbert
2. (*a*) Siug for R. P. I. . . . . Adams
   (*b*) In Silent Mead . . . . . Emerson
3. (*a*) Gartland March . . . . . Boehnlein
   (*b*) Romance of a Rose . . . . . O'Connor

PART II.

1. (*a*) Dixie Blossoms . . . . . Heinrich
   (*b*) Big Chief Battle Axe . . . . . Allan
2. (*a*) In a Pagoda (Peice Characteristique) . . Bratton
   (*b*) The Chatterers (Morcean Characteristique) . . . . . Bendix
3. (*a*) Over the Banister . . . . . ———
   (*b*) Soldiers' Chorus from Faust. . . . . Gounod

AWARD OF R'S.

A general assembly was held on March 14th for the purpose of awarding Rs to athletes, and to discuss several matters of student interest. The meeting was called by Dr. Mees who addressed the student body for several minutes before turning over the chair to O. L. Stock, President of the Student Council.

Mr. Stock submitted the proposed new constitution of the Student Council to the assembly for ratification. There was some discussion about the Telegraph Association, which is at present not active, and which it was proposed to drop from recognized organizations. A standing vote for ratification was taken, and only twenty-five persons voting against, the new constitution was declared adopted.

A resolution petitioning the faculty to hold condition examinations in April instead of in June, was unanimously adopted, after discussion by Messrs. Stock and R. L. Smith, and Dr. White.

H. E. Schmidt, president of the Athletic Association, took the chair at this point, and the R's awarded to athletes were given out by Dr. White, who prefaced the distribution by some appropriate remarks.

The R's were given to the following persons:

Basketball, 1907. Messrs. Trueblood, B. Shickel, Lindeman, Hadley, Webster and Wayne Curry.

Reserve R's. Messrs. Glenn Curry anp Nicholson.

Basketball 1908. Messrs Schmidt, Markley, Lindeman, Hadley, Gray, Webster, Lammers, Piggott and Wayne Curry.

Reserve R's. Messrs. Offutt and Standau.

Basketball 1907. Messrs. Douthett, Mooney, Hadley, Heidenger, Backman, Baylor, B. Shickel, Miner and Schmidt.

Football, 1907. Messrs. Pritchard, Uhl, Jewett, Schmidt, Backman, Offutt and Standau.

Tennis, 1907. Messrs. Uhl and Hathaway.

ROSE 25; EARLHAM 29.

Earlham defeated Rose in a hotly contested basketball game Friday night, March 6, at Richmond. All through the game Rose remained just a few points behind the Quakers.

In the first half the game was very slow, Rose only registering three field goals and one foul goal, while Earlham dropped in two field goals and six free goals. This small score seemed to make each team more determined to win. In this half Earlham was given a point and the score stood: Rose 7; Earlham 11. In the second half both teams started some fast playing, but Rose could not overcome Earham's small lead and the game ended with the Quakers in the lead by 4 points.

SUMMTRY.

ROSE	POSITION	EARLHAM
Lammers	Guard	Newsom
Hadley	Guard	Hancock
Gray	Center	Chambers
Lindeman	Forward	Wilson
Webster	Forward	Hotchkiss

Field Goals—Hadley, 4; Gray, 3; Newsom 1; Chambers, 1; Wilson, 4; Hotchkiss, 2.

Foul Goals—Hadley, 8; Lindeman, 1; Wilson, 11.

Points Awarded—Rose, 1; Earlham, 2.

Referee—Guedel.

Umpire—Hunt.

ROSE 33; EARLHAM 13.

Rose defeated Butler in a fast game Saturday night, March 7, at Indianapolis. Webster and Gray played a good game, scoring 18 points. The game was very slow all during the first half, only 20 points being scored, Rose getting the most of these.

After the first half Rose got her scoring machine to working and when the whistle blew, Rose had the long end by quite a number.

ROSE.	POSITION.	BUTLER
Webster	Forward	Murray
Lindeman	Forward	Kingsbury
Gray	Center	Kitterman
Hadley	Guard	Rose
Lammers	Guard	Davenport, Edwards

SUMMARY.

Field Goals—Webster, 4; Hadley, 2; Gray, 5; Lindeman; 1; Rose, 1; Edwards, 1.

Foul Goals—Hadley, 8; Rose, 8.

Points Awarded—Butler, 1.

Referee—Guedel.

INDOOR FIELD MEET.

Juniors, 35; Sophomores, 20; Freshmen, 9; Seniors, 8.

The Juniors won the indoor field meet held Saturday, March 28, scoring 35 points, while their opponents totaled only a score of 37.

The results are as follows:

15 Yard Dash—Douthett, '09, 1st; McCormick, '08, 2nd; Devonald, '10, 3rd, Time, 2⅕ seconds.

Shot Put -- Standau, '10, 1st; Backman, '10, 2nd; Darst, '09, 3d. Distance—34 feet.

15 Yard Low Hurdle—Douthett, '09, 1st; Buckley, '09, 2nd; McCormick, '08, 3rd. Time —2⅕ seconds.

High Jump—Smith, '09, 1st; Buckley, '09, 2nd; Madison, '10, 3rd. Height—5 feet 4¾ inches.

Relay Race—Senior Team: Lindeman, Hathaway, Uhl and McCormick. Junior Team: Tyler, Smith, Darst and Buckley. Sophomore Team: Nicholson, Standau, Devonald and Thomas. Freshman Team: Voss, House, Springer and Worsham.—Freshman 1st, Juniors 2nd, Sophomores 3rd.

Running Broad Jump—Smith, '09, 1st; Standau, '10, 2nd; House, '11, 3rd. Distance—18 feet 2 inches.

Pole Vault—Nicholson, '10, 1st; Douthett, '09, 2nd; Brennan, '09, 3rd. Height 8 feet 9 inches.

Parallel Bar Dip—McWilliams, '09, 1st; Worsham, '11, 2nd; Hay, '10, 3rd. 18 dips.

The officials were—Kimmel, referee; Coach Knight, starter; Turk, Howey and Lindeman, judges of finish; Howey and Curry, field judges; Prof. Johonnott, Schmidt and Kimmel, timers; Armstrong, clerk of course.

THE BASEBALL SCHEDULE.

April	17	Purdue	at Lafayette, Ind.
"	18	E. I. S. N.	" Terre Haute
"	23	Wabash	" Crawfordsville
"	25	Normal	" Parsons Field
May	2	Wabash	" Terre Haute
"	8	Normal	" Rose Campus
"	9	Notre Dame	" Notre Dame, Ind.
Moy	12	Indiana	" Bloomington
"	16	Butler	" Indianapolis
"	19	Wabash	" Crawfordsville
"	21	De Pauw	" Greencastle
"	23	E. I. S. N.	" Charleston, Ills.
"	27	Normal	" Neutral Grounds
"	30	De Pauw	" Terre Haute
June	6	Wabash	" Terre Haute

CONSTITUTION OF THE STUDENT COUNCIL OF ROSE POLYTECHNIC INSTITUTE.

PREAMBLE.

In view of the fact that men who regularly deal with natural forces and the practical application of scientific principles to the facts of life are liable to lose sight of the humanities, and in view of the fact that without the co-operation and patronage of the members themselves no organization can thrive, and with a view toward establishing the present associations of students on a firm foundation, and providing for their future welfare and prosperity, we, the students of Rose Polytechnic Institute, ordain and establish this Constitution.

ARTICLE I.

SEC. 1. All the executive powers herein granted shall be vested in a Council, known as the Student Council of the Rose Polytechnic Institute.

SEC 2. The Council shall consist of

The President of the Senior Class,
The President of the Junior Class,
The President of the Sophomore Class,
The President of the Freshman Class.

and the presiding officer of each recognized student organization, except as herein provided. A recognized student organization is one which has adopted a Constitution and By-Laws acceptable to the Council; has been duly registered with the Faculty, and is recognized by the Council as eligible to representation in the Council, the Council reserving the right to declare any organization ineligible to future representation.

At the time of the adoption of this Constitution the recognized organizations are:—

The Rose Technic.
The Rose Polytechnic Athletic Association.
The Scientific Society.
The Rose Polytechnic Y. M. C. A.
The Rose Tech Camera Club.
The Rose Symphony Club.

In the event of one student holding the presiding office in two or more organizations, he shall represent the organization first in the order herein named, and each unrepresented organization shall choose its representative.

Councillors shall hold office for one year, beginning

with the first regular meeting of the Council after the opening of the fall term, which meeting shall be held on the second Saturday after the opening of the Institute in the fall. Organizations having representatives in the Council shall elect them before the time of this meeting, and any organization failing to so elect shall be unrepresented in the Council until its representative shall be elected, when the newly elected Councillor may be seated by the consent of a majority vote of the entire Council.

SEC. 3. The Council shall choose its own officers. They shall be a President, a Vice-President, a Secretary, a Treasurer and a Clerk. These officers shall be elected at the first regular meeting of the year, to hold office for the term of one year. In case of a vacancy in office in the Council, it shall be filled by an election within ten school days.

SEC. 4. The President shall preside over all meetings of the Council and perform all other duties belonging to his office or prescribed by the Council.

The Vice-President shall perform the duties and offices of the President in the absence of the President.

The Secretary shall keep complete minutes of all meetings and perform all other duties belonging to his office or prescribed by the Council.

The Treasurer shall rcceive all moneys for the Students, Fund and shall be held responsible for the record pertaining to the same. He shall perform all other duties belonging to his office or prescribed by the Council.

The Clerk shall file all petitions, preserve all information resulting from investigations, care for all documents and perform all other duties belonging to his office or prescribed by the Council.

ARTICLE II.

POWERS AND DUTIES OF THE COUNCIL.

SECTION 1. The Council shall formulate and present all petitions from the student body to the Faculty or Board of Managers; shall deliberate and act upon student reforms; shall endeavor to keep college politics clean; shall confer with the Faculty or Board of Managers when desired to do so upon any matter of college interest; shall foster a strong college spirit; shall attend to such items as are usually neglected for want of a definite student committee; shall call a general assembly whenever necessary; shall call upon such students or members of the Faculty as they deem necessary in order to obtain information upon any matter brought before the Council for consideration; shall fix the amount payable to the Students' Fund by each student, and shall fix the distribution of the Students' Fund.

SEC. 2. The Council shall proclaim their acts by posting on the bulletin board for three school days, provided that if any transactions are considered best withheld, it shall be so decided before adjournment of a regular or called meeting. No exception having been taken to any act within three school days after its publication, the same shall be considered approved. If a written exception, signed by fifteen students, is taken to any act of the Council, the Council shall call a general assembly, and it shall require a majority vote of those present at the assembly to ratify the action of the Council, provided that the number of students attending the assembly shall be not less than two-thirds of the number of enrolled students in the Institute.

SEC. 3. The Council shall hold regular monthly meetings. Six members shall constitute a quorum.

SEC. 4. At the regular meeting in May the President of the Council shall appoint a committee of three members to audit the accounts of the Treasurer of the Council before the accounts are closed for the summer.

The documents and records of the Council shall be filed with the Registrar of the Institute during the summer vacation.

ARTICLE III.

SECTION 1. Any amendment to this Constitution, in order to be valid, must, after at least one month's notice, be adopted by a two-thirds vote of the entire Council, then, after publication and notice of at least one week to the students, shall require a majority vote of the entire number of enrolled students in the Iustitute for its final adoption.

BY-LAWS OF THE STUDENT COUNCIL OF ROSE POLYTECHNIC INSTITUTE.

I. The Council shall meet at least once a month during the session of the Institute; the time and place of meeting to be decided upon at the first regular meeting of each Council.

Special meetings may be held at the call of the President or of three members.

II. Any member of the Council who is guilty of gross violation of the Constitution or By-Laws shall be retired from office.

After each regular meeting it shall be the duty of the Secretary to deliver the following written notice to any member or members absent from said meeting and who have not given an adequate excuse to the President for such absence:

DEAR SIR:

At a regular meeting of the Council held on ——— ——— you were marked absent on the roll. It is my duty to inform you that should you be absent from the next regular meeting without an adequate excuse, you shall be retired from office.

(Signed) ——— ——— Sec'y.

Should the same member absent himself the second time, as stated above, it shall be the duty of the Secretary to inform the Council of the fact at the next regular

meeting. If the President has received no adequate excuse from the absentee, he shall instruct the Secretary to notify said absentee of his retirement from office. Upon the retirement of any member for this offense the Secretary shall inform the organization which he represents, in writing, of his retirement, and such organization shall elect a successor.

III. In case an organization desires to contest the seat of its representative in the Council it shall submit its reasons for the contest to the Council in writing. In such a case a vote of a majority of the members of the Council shall be sufficient for expulsion.

IV. The Clerk shall keep a separate record of all resolutions and rules made at any time for the government of the Council or of the Student Body, and such rules and resolutions shall remain in force until set aside by a majority vote. The Constitution and By-Laws with these rules shall be kept in book form.

V. The Students' Fund, created by the assessment upon each student of $10.00 per annum, shall be divided as follows: 50% to the Athletic Association; 16% to the Rose Technic; 13½% to the Symphony Club; 10% to the Y. M. C. A.; 1% to the Scientific Society; 2% to the Camera Club, and the remaining 7½% shall comprise a General Fund, which shall be at the disposal of the Council.

The Students' Fund shall not be split up. No organization shall have the power to admit a member of the student body into its individual privileges on payment of its percentage of the Students' Fund.

Every student of the Institute, on payment of the Students' Fund is eligible to membership in any recognized organization. The Symphony Club, in virtue of necessary qualification, shall, with the advice and consent of the directors thereof, be given the right to elect members. On the refusal of any student to pay the Students' Fund he shall not be eligible to join any student organization.

VI. The Students' Fund shall be deposited in a reliable National Bank.

VII. In case any recognized organization shall, at the end of the school year, have on hand funds received from any source other than the Students' Fund, which were received to be applied to some specific object, these funds shall be considered trust funds to be returned at the beginning of the following school year, provided, however, that money received as admission fees to games or entertainments, and similar regular sources of income shall not be applied to some specific object so as to come under the terms of this Article.

VIII. Any organization desiring to draw money from its allotment shall present an itemized voucher, signed by the President and Treasurer of that organization. This voucher in turn must be signed by the President and Treasurer of the Council before payment. In case it becomes necessary for a treasurer of any organization to draw money in advance, for a particular object, he may do so by presenting a voucher, drawn to his name, on which is an itemized statement of the proposed expenditure.

IX. The President of the Council may refuse to sign any voucher until the Council has approved of it. The Treasurer may refuse to sign vouchers or pay money if the account of any organization be thereby overdrawn, unless specially instructed to do so by the Council.

X. Organizations requiring funds during the summer, or after the closing of the Treasurer's books in June, may hold such sums as they require, on presentation of a voucher as described in Article VIII.

XI. The order of business shall be:

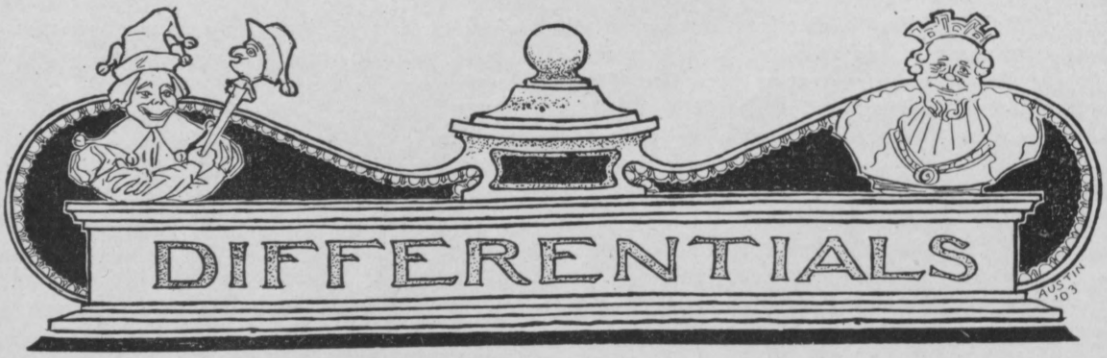
Roll Call.
Reading of Minutes.
Report of Offiers.
Report of Committees.
Unfinished Business.
New Business.
Remarks of general interest to Student Body.
Discussion as to publicity of proceedings.
Adjournment.

XII. The rules contained in Robert's Rules of Order shall govern the Council in all cases to which they are applicable and in which they are not inconsistent with the By-Laws of the Council.

XIII. These By-Laws may be amended by a two-thirds vote of the Council, at least one week's notice of the proposed amendment having been given.

XIV. A two-thirds vote of the Council is necessary for the adoption of these By-Laws. After adoption these By-Laws shall supersede all former rules and By-Laws with which they are inconsistent.

XV. Continued absence of a Councillor from the Institute for three consecutive school weeks shall be considered as withdrawal from the Institute, unless written notice to the contrary be filed with the Clerk of the Council.



Nick: "Washie, where's your frat pin?"

Washburn: "It's on the lapel of my other coat."

Barney: "Verily, it *is* on the lapel of his other coat about 10:30 every Sunday night."

Freshman, looking at the batting cage in the gym.: "Who owns that seine that's drying up there?"

Schweers,' 10, in slop drawing: "I don't think this is a very high class of work for an engineer."

The following definition of "quiz" is found in Webster's dictionary:

Quiz: A hoax; a jest; one who quizzes, v. t., To make fun of as by obscure questions.

Dutch, in Lab.: "Look out, fellows, here he comes!"

Doc. White, entering: "What did you mean by your remark just now, Mr. McCormick?"

Dutch: "Oh, I just meant Christmas was coming."

Doc. White, to Wey, in Journal Review, after trying him on French and German: "Well, can you read English then?"

Wey: "I don't know; it has been so long since I tried."

ELECTRICAL NOTE.

A large unit of resistance was discovered the other day in the laboratory. It has been called the "ottiwell". Definition unnecessary.

Mosby, '09, (during a heated argument): "Sure, don't you remember in Caesar where it says 'Ich musz uber die Flusz setzen'?"

Reilley, '09: "Ash Wednesday is just to remind people that they are only ashes."

Mosby: "Then I suppose a coon is a bunch of soot."

Brannon, '09, (noticing that his shoes have been wiping on Brennan's clothes for some time): "Please excuse me."

Brennan: "All right, no extra charge for shines."

Northcott, of the Normal, also Y. M. C. A. secretary for Rose, attended a Y. M. C. A. convention at Culver. When about to engage in a game of ball he laid his coat on the grass. The coat contained a watch. After the game (?) the watch was missing. At least this is Johnnie's story.

As seen from without.—On Friday evenings, when the relentless indicator of time only too soon proclaims the hour of 11, the moment of parting (oh, unhappy hour!) is at hand. How one lingers in the vestibule as tho it were impossible to—"break away". With a great effort one finally plunges into darkness without to slowly wend one's way south (Collett Park being located in the northern part of the city), entirely unaware of the fact that the shades of night—*alone*—were drawn. Alas! such things will oc-Ker!

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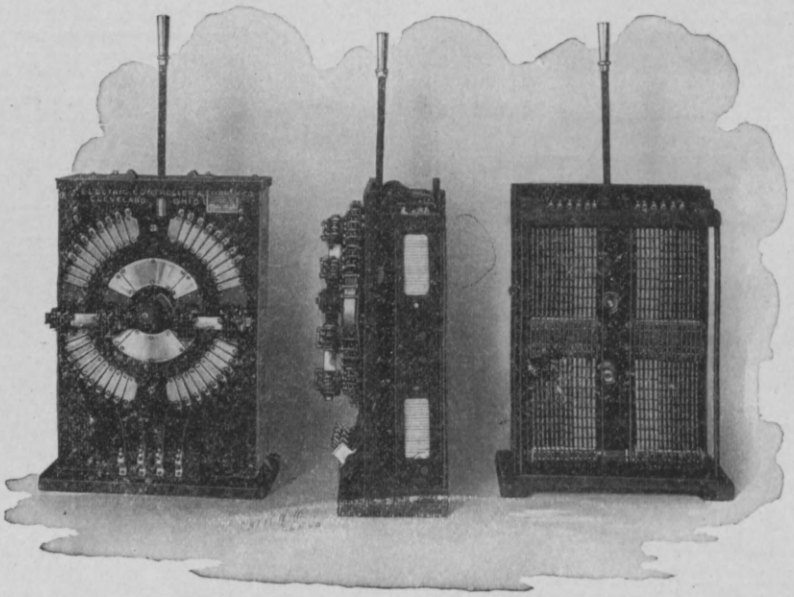

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