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The Rose TECHNIC

MONTHLY PUBLICATION OF THE STUDENTS
OF ROSE POLYTECHNIC INSTITUTE

NOVEMBER
1929

VOL. XXXIX TERRE HAUTE, IND. No. 2

Member of Engineering College Magazines Associated

WHAT YOUNGER COLLEGE MEN ARE DOING WITH WESTINGHOUSE

This 5000 h.p. motor in the Columbia Steel Company's Plant, with its frame of arc-welded steel, is physically the largest synchronous motor ever built.

H. R. HILLMAN
Contract Administration
Carnegie Institute of Technology, '22

W. B. SHIRK
General Engineer
Lehigh University, '20

B. I. HAYFORD
Switchboard Engineer
Syracuse University, '22

H. C. MEYERS
Machine Design
University of Nebraska, '27

H. G. DILLON
Production Supervisor
Oklahoma A & M College, '23

Ninety days to go— teamwork wins

While you Seniors were shuffling worries about machine stresses and saturation curves with those of football last fall, a group of your predecessors, not so many years ahead of you, were playing the game with grim realities.

The Columbia Steel Company of Pittsburg, California, completed plans on September 12th to build a new tinplate plant. On the 13th they gave an order to Westinghouse for two 5,000 horsepower synchronous motors to drive the rolls, to be physically the largest synchronous motors ever built. Delivery of the first was wanted in ninety days.

Ninety days in which to design, manufacture, assemble, test and ship any large unit, let alone a new achievement in size and type of construction, affords no time for idle speculation. Westinghouse men went at the job as only an experienced and thoroughly equipped organization could do. And on the scheduled date, four flat cars and a box car rolled out of the Westinghouse plant, carrying the completed and tested motor.

It was an industrial victory, as satisfying as any athletic gain. Teamwork and individual skill had won. Westinghouse had once more made good and upheld the reputation that earns the big electrical jobs for Westinghouse men.

Westinghouse

THE ROSE TECHNIC

PUBLISHED MONTHLY BY THE STUDENTS AND ALUMNI OF ROSE POLYTECHNIC INSTITUTE

VOL. XXXIX NOVEMBER, 1929. NUMBER 2

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Mr. Williard V. Merrihue, Chairman, 1 River Road, Schenectady, N. Y.

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To awaken each morning with a smile brightening my face, to greet the day with reverence for the opportunities it contains; to hold ever before me, even in the doing of little things, the Ultimate Purpose toward which I am working; to meet men and women with laughter on my lips and love in my heart; to be gentle, kind and courteous through all the hours; to approach the night with weariness that ever wooes sleep and the joy that comes from work well done—this is how I desire to waste wisely my days.—Thomas Dreier.

THE ROSE SHOW

Professor C. C. Knipmeyer

THERE is abundant evidence that this will be a very busy and happy year at Rose. Class work certainly will keep every one busy as usual, and happy too, let us hope. But class work, even though generously heaped on, is not enough to give full outlet for the vigor and ambition of Rose students. Something more is needed for the healthy bodies, alert minds, fine spirits and loyal hearts of typical Rose men. That thing, precisely, is the Rose Show.

Not a member of the student body or of the faculty, but had his pulse quickened and his pride stirred at the realization that this is Show year and that the Show is to be put on. Seldom in this complex life of diverse ideas and interests is there unanimous agreement on anything. We might naturally expect to find some who would not approve of the show or at least withhold active support. But there are reasons for the complete agreement that the 1930 Show shall be produced.

The show of 1928 proved a surprise and revelation both to the visitors and to the producers. Engineers, valuable as they are to human welfare, are not expected to be entertainers nor their work of special interest to non-technical people. Their tastes, their talents and their business are thought to lie quite outside the field of things entertaining. They themselves accept this view of it. Hence the surprise to them as well as to the general public, when this show proved the finest entertainment ever produced in Terre Haute.

The last Rose Show was a stupendous exhibition. Men came from far and wide to view the interesting demonstrations of engineering phenomena, and went away feeling their evening had been very profitably spent. They told their friends of the wonders they had seen, and these friends came, saw, and went away to tell others. Old Rose certainly was proud to see how enthusiastically everyone worked to make the event a success.

The time has come for Rose again to show her engineering skill. The opportunity is welcomed by every true Rose man. The Show will instruct and entertain the public, advertise most favorably the school, and be a real education to every student who does his part. Now is the time to get busy. We need the enthusiastic support and active assistance of every student.
—Editor.

The student body and the faculty of Rose are actively loyal. The success of the former show in pleasing the public and in educating the community into a deeper appreciation of Rose calls for another show. The call will be answered most heartily.

The high quality of the former show brought forth great praise. There were many discussions among visitors as to which of the fine exhibits was finest. However, it was the magnitude of the display that caused actual amazement. Half as many exhibits would have satisfied the crowds. But half as many exhibits would not have satisfied the pride and energy and resourcefulness of the exhibitors. Hence a show was put on that could not be fully covered in a single evening. Many people came twice and some three times, paying admission each time and insisting the price was too low.

The organization for the new show is being carefully formed. While the show is fundamentally a student activity, the faculty wants to help and can perhaps do most good in the organization plans. Therefore, where it seems advisable, the faculty enters into the organization. They will be advisory heads of committees on Exhibits, Program and Tickets, Publicity, Guides, Space Assignment, Placards and Signs, Power and Lights, and Decorations. In each department of the school, Architectural, Chemical, Civil, Electrical, Mechanical, Military, Physics, and Shop, there will be a chosen senior, a junior, a sophomore, and a freshman as the chairman for his group. The election is made not on a basis of personal popularity at all, but emphatically on ability to measure up to the responsibilities of the job.

The organization, comprising faculty and student chairmen, having been formed, will at once begin to have frequent meetings to discuss and settle the many questions which arise, deliberate over the proposed exhibits and see that steady and satisfactory progress is being made. These meetings will probably occur every week. They should be highly efficient and inspirational.

Lists of accepted exhibits will be published from time to time, together with a progress report on each. It is strongly urged that students come forward with ideas for exhibits. All are agreed as to the quality of exhibits desired. There is, however, question as to the proper number. In our former show there were 230 exhibits. This number almost equalled the number of students. With men out for guide and band duty there was a serious shortage of men. This shortage became even more serious when some students acted on a natural desire to inspect the whole show themselves. It is the duty of the Exhibits Committee not only to pass on the proposed exhibits, but also to assign men to various departments and to certain exhibits in those departments. Success and efficiency demand absolute respect for decisions of this committee.

One of the many fine features of the former show was the printed program. It was well composed and richly made up. It was just such a program as the show merited.

Our Publicity Committee this year will have an easier task and less worry than that of two years ago unless it proposes to bring more people to the show than can be accommodated. Broadly speaking, this committee will consist of the five thousand people who came to the former show, and it will be a very

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Mapping Projects by Government Agencies

R. Selee, 1st Lieutenant, Corps of Engineers

IN December, 1919, there was created by Executive Order, the Federal Board of Surveys and Maps, charged with the co-ordination, prevention of duplication and the expedition of all government topographic mapping in the United States. The agencies that were affected principally by this order were the United States Geological Survey, the United States Coast and Geodetic Survey and the Corps of Engineers, U. S. Army. By the appointment of this Board and by the fact that the Temple Act was passed by Congress a short while later, there was ample evidence that in the minds of the President and of Congress there was a firm conviction that there would have to be greater activities in this country in the production of topographic maps. The Temple Act, passed by the 68th Congress, was an act which provided for the complete topographic mapping of the country within a period of twenty years, in the execution of which the President was empowered to use any of the government agencies. Unfortunately this act has proved to be nothing but a gesture for no funds were appropriated at the time and none have been forthcoming since.

In spite of the fact that Congress failed to make its own mapping project a possibility, the three mapping agencies just recited have pushed ahead and have done all that they can, to effect gradually a complete topographic map of the country. However, much progress that has been made in getting out new maps has been offset to a considerable degree by the fact that almost as fast as new maps are made, other areas mapped from 25 to 40 years ago, are becoming obsolete. Limited funds in all departments have always throttled down this work to an exasperating degree and they always will until Congress makes good its intentions of the Temple Act and provides money explicitly for it.

The 49th Annual Report of the Director of the Geological Survey to the Secretary of the Interior for the fiscal year ended June 30, 1928, reports that during the preceding year topographic work was done in co-operation with 26 States and that the area mapped was 17,121 square miles of which 13,777 square miles were new survey, 2,407 square miles resurveys and 1,537 square miles were revisions. The total area of the country mapped up to June 30, 1928, was 1,314,316 square miles, most of which is done to a 1:62500 scale. This represents 43.2 percent. of the country excluding Alaska and our foreign possessions. Topographic mapping within the various States by the U. S. G. S. is ordinarily executed on a 50-50 basis with the Federal Government spending one dollar for every dollar spent by the State concerned. Nine States and the District of Columbia are entirely mapped. They are Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, Ohio, Rhode Island, and West Virginia. The state of Indiana has 10.1 percent. of its area mapped and in the 48 states there are but three that have done less—Florida, Minnesota and Mississippi. This means that Indiana has spent $1,323.40 on this work in 44 years, an average of $30 a year for mapping her 30,000 square miles. Her next door neighbor, Illinois, on the other hand, has seen fit to spend $495,358.96 for the same purpose in the same period of time. Indiana's neighbor on the other side, Ohio, is 100 percent. mapped and has spent $360,500.00 in getting there.

In addition to making, printing and distributing topographic maps the U. S. G. S. maintains efficient and complete departments for geologic investigations, most of which are worked on the same basis with the states as for the topographic maps; geologic and topographic mapping of Alaska; investigation of water resources of the United States and its possessions; and for classifying and leasing public lands.

Work of the United States Coast and Geodetic Survey which comes under the Department of Commerce included the following for the fiscal year 1929. Arcs of first order triangulation were completed from Augusta, Maine to the International Boundary line; from Pittsburg, Pa., to Painsville, Ohio; Sandusky, Ohio, to Portsmouth, Ohio; Bardstown, Ky., to the West Virginia boundary; Owingsville, Ky., to Portsmouth, Ohio; Chariton, Iowa, to Danville, Ark., and from Springfield, Mo., to VanBuren, Mo. This work is part of a program from the triangulation of the eastern half of the United States, east of the 98th Meridian and is preliminary to an adjustment of the eastern triangulation net. The triangulation net of the western half of the United States has already been adjusted. In connection with the U. S. C. & G. Survey's seismic investigations a first order triangulation arc was run from Newport Beach to Bear Lake, California, a distance of 1,150 miles. During the year lines of first order leveling were completed in a half dozen States. This leveling is in pursuance of a program which contemplates that eventually no place in the United States will be more than 50 miles from a standard bench mark. These control surveys, including triangulation, leveling and precise traverse are preliminary to all accurate detailed topographic surveys and all maps which are tied in to this control are on one standard datum—the North American Datum which unifies all map making activities on the North American continent.

In addition to its work of producing charts of the coastal waters of the United States, some 103,000 miles of coast line, and executing control surveys in the interior of the country, the Coast and Geodetic Survey has been charged by Congress with making airways' maps. These maps are made to a scale of 1:500,000 and thus far, have been made from existing strategic maps by deleting information not required in air navigation and by emphasizing and adding detail that is required. Air maps are printed in strips which include areas either 80 by 200 miles or

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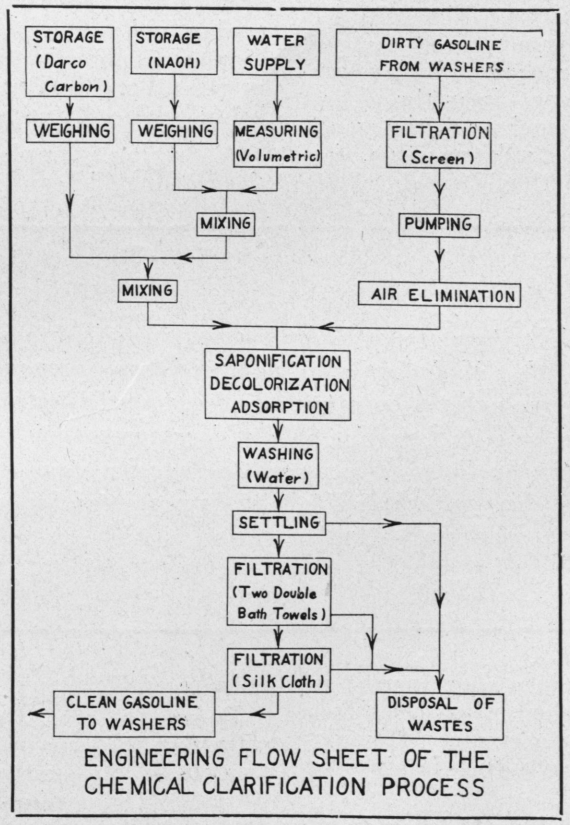
The Recovery of Dry Cleaners' Solvent

Professor R. C. Kintner

IN the study of the various typical and essential industries many lesser ones are often overlooked. These lesser industries, in which the problems are just as real as in more important ones, are sometimes of great interest. Such a one is the dry cleaning industry where the problem of recovery of solvent is paramount. There would be no dry cleaning of men's suits for $1.50 if the solvent used in such cleaning were not recovered and used again. The average dry cleaner uses about 50,000 gallons of solvent per week. This does not mean that he has that amount on hand but that he uses his supply over and over again until he has handled the equivalent of 50,000 gallons. From 1,500 to 5,000 gallons are in process, depending on the method of recovery.

In a general sense the dry cleaning of clothing is very simple. The apparel to be cleaned is placed in a washer and agitated in the presence of a suitable solvent for a period of time. The clothing is then taken out and placed in a drying apparatus where the last of the solvent is removed by evaporation. A vacuum is usually maintained in the dryer. Any spots which resist the action of the solvent are removed by hand with special spotting fluids. In some cases the spots are removed prior to the machine washing. Pressing or ironing completes the job.

The washer is so arranged that the solvent flows through it continuously. Leaving the washer, this solvent is led through a purification system and returned again to the washer. It is with the various recovery systems that this article deals.



ENGINEERING FLOW SHEET OF THE CHEMICAL CLARIFICATION PROCESS

The solvents generally used are special grades of gasoline and are marketed under trade names such as Energine, Stodsol, etc. The impurities present after washing the clothing consists of considerable dirt combined with small amounts of grease, oils, fats and some pine oil "soap" which is gasoline-soluble. Depending upon the quantity and kind of these impurities and the presence of others not mentioned (waxes, spotting fluids, etc.) the process and machinery must be chosen for each locality and each class of business.

There are four methods of recovery in use today; Pressure Filtration, Centrifugation, Distillation and Chemical Clarification. Each has its advantages and disadvantages which are discussed below.

Pressure Filtration. In this process the solvent is conducted from the washer to a small pump by gravity and pumped thence through a closed filter back to the washer. The filter is simply a closed tank in which are suspended a number of cloth bags through which the solvent must pass. A precoat of some filter aid such as Hyflo-supercell or "Lava Powder" is put on the bags and the process started. This is the cheapest method of purification and is the most widely used. Its most objectionable feature is that it removes only the solid matter, leaving the grease, oils, etc., to gradually build up to a troublesome concentration, although it is claimed that some filter aids remove a part of these. The fact remains, however, that the mineral oils will, in time, build up.

Centrifugation. In this process a Sharples Super Centrifuge is substituted for the filter. No filter aid is used as this would merely add to the solid material in the solvent. The slight difference in specific gravity between the solvent and the impurities is sufficient to allow of their separation in a centrifuge of this kind. The same objectionable materials are allowed to pass due to the fact that most of the oily constituents are dissolved in the solvent. The high cost of installation and operation as compared with the bag filters has prevented the general use of the centrifuge for this kind of clarification.

Distillation. Three methods of distillation are used: steam, pressure and vacuum stills being employed. Steam distillation is the best from a quality standpoint in that all the impurities are removed and a water-white solvent which has not been changed by "cracking" is obtained. The process, however, is the most costly to operate due to fuel consumption and therefore is seldom employed. Pressure stills produce some "cracking" effect and in this way change the characteristics of the solvent. Some of the oils distill over but the dirt, greases, waxes, etc., are removed. Were it not for the introduction of the vacuum still, the pressure still might be in more general use. The vacuum still possesses all the advantages of the older type and in addition does not produce as much "cracking" effect as the pressure variety. This "cracking" produces decomposition products and these are said to be the cause of odor troubles in the clean clothing. The initial cost of installation of a vacuum still is higher than the others but the low cost of operation soon makes up for this. This method is coming more and more into

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SYNTHETICS

Frederick J. Bogardus, m., '32

NOT many years ago nearly all substitutes were spoken of with contempt or derision. Papier mache shoes, substitute fats, roasted prune pits for coffee, and many other artificial foods and commodities of the time were not conducive to the satisfaction and pleasure of the consumer.

Of course, this was due, in a large measure, to the World War. Great pressure was brought to bear on scientists the world over to create substitutes for foods and goods, especially for those imported. This is what has happened during nearly every war in the past century—the inevitable result of blockades and high prices.

One good result, however, was to awaken the people to the possibilities of synthetics. The scientists kept at their work of developing new products, and the public was educated to use them. Today synthetics are being used by everyone—from the richest to the poorest, from the largest combine to the smallest industry. Synthetic leather, silk, gasoline, fertilizer, soap, and many other artificial products are in daily use.

All this seems drab, however, when contrasted with what is possible in the future. A few months ago, at the Carnegie Institute of Technology at Pittsburgh, Dr. Friedrich Bergius announced that he had succeeded in making coal from wood, cornstalks, and cabbages. He subjected cellulose to intense heat for twenty-four hours, and the result was coal. Thus, in a short period of one day, Dr. Bergius accomplished what has taken Nature thousands of centuries to create. His discovery may result in postponing a fuel famine for many generations.

"The story of synthetics is an amazing and inspiring tale. No longer need the world fear a monopoly of some natural industry. No longer need it fear a food or a fuel famine. The development of synthetics has long since passed the novelty stage, and some day our whole life may be regulated by synthetic products."—Author.

Another German, Dr. Fritz Hoffman, has produced rubber from coal in his laboratory. Although it is still more expensive than natural rubber, the time may come when all rubber used will be synthetic.

One of the good points of many synthetics is the utilization of waste products. Not long ago the announcement was made that food, or more specifically, sugar, had been made from sawdust. Two German scientists took some sawdust, added one molecule of water to each molecule of cellulose, and produced food fit for animals. This process will probably make possible a cheap stock food, and, at the same time, a tremendous saving of waste material.

A Philippine chemist has invented a substitute for cotton fiber, which he produces from banana stalks. The cellulose binding of the fiber is "cracked off," leaving the fiber pure white and ready to weave.

Another substitute for cotton was found in a most peculiar way. A small bird in British Guiana was seen building its nest from material which looked like cotton. It proved to be fibers of a plant stripped and treated by the bird. English research workers took the seed and roots to England and planted them. Today ordinarily unproductive soil in Essex and Sussex counties is growing between three and four million pounds of this synthetic cotton. In addition to using waste soil, the substitute is eight cents per pound cheaper than the real article.

Aside from the amazing and novel effect of all these new products, there is the effect on the markets and the business world. The manufacturers who yesterday had a monopoly of certain articles, today find themselves forced into cut-throat competition against new synthetic products. Long-established trades are being replaced and older commodities displaced.

A striking example is that of synthetic nitrate and the natural Chilean product. Chile, for many years, dominated the world trade in this necessity by virtue of her monopoly of the product. This monopoly has been completely disrupted by the synthetic nitrate, and long-established trade routes have been dislocated, with serious results to one South American country. Furthermore, the growth of the substitute has completely changed the trade balance of Germany.

Before the war, Germany was importing natural nitrate at the rate of $41,000,000 a year. Today her exports of the synthetic product total nearly $48,000,000. The development of this industry has given her complete independence from Chile, and, incidentally, from her prewar obligation to British capital. It has taken the key position in the expansion of Germany's chemical industry since the war. Within twenty years the fixation of nitrogen from air has grown from a laboratory experiment to the production of over 1,000,000 tons annually. At the same time the production of Chile nitrate has dropped to about 270,000 tons. As a result Chile has been forced to reduce production costs and to spread extensive propaganda in favor of the natural product.

Camphor furnishes us with another illustration of the same phenomenon. Prior to 1925 Japan controlled practically all the camphor produced. Under this monopoly the price rose as high as $2 a pound.

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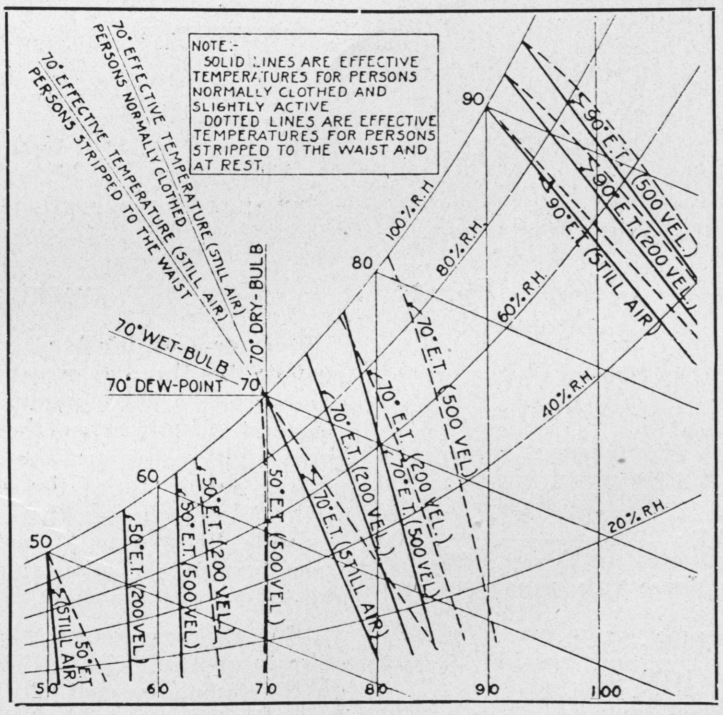
Air Washing and Conditioning

T. S. Cliff, e., '30

IT has long been known that the humidity of air is an important factor from the standpoint of one's comfort. Temperature which is always read from the thermometer is not the only criterion. Only recently, however, have the very definite laws concerning comfort, the relation between temperature, relative humidity and air moment been determined.

In general, carrier washers are designed to obtain the proper degree of saturation and dust elimination from outdoor air or a combination of outdoor and recirculated air to obtain the conditions for ideal comfort.

It is a familiar fact that a room may be comfortable at one temperature and yet decidedly uncomfortable at another time, even though the same dry bulb temperature prevails. This may be due either to change of relative humidity or to air motion. On the other hand the room may feel equally comfortable under different dry bulb temperatures, provided either relative humidity or air motion is changed. The name "effective temperature" has been used to designate any series of conditions producing the same degree of comfort upon the human body. The American Society of Heating & Ventilating Engineers has, at its Research Laboratory, investigated and charted these conditions over a wide range of temperatures, humidity and air motion. Tests were made on people stripped to the waist and in still air, and afterwards the effect of air motion were studied.



Location of Effective Temperature Line on Psychrometric Chart.

These studies have revolutionized the whole science of heating and ventilating with regard to comfort. It is practical now to obtain a degree of comfort in homes, theaters and auditoriums in hot weather or in industrial plants such as glass factories and steel mills which heretofore was thought impossible. The newer science is a simple application of fans and air washers with a properly designed distribution system.

The relation between the wet and dry bulb temperatures and the moisture content is clearly indicated by the accompanying psychrometer chart. It will be seen that a cubic foot of air at 70 degrees will hold eight grains of moisture while at 32 degrees it will hold only two grains and at zero only five-tenths of a grain. In the ordinary methods of heating with the air temperature 32 degrees outside, the humidity of this air when heated to 70 degrees without the addition of any moisture would be only 15.5% which is far less than the humidity of the driest climate known. It is this extreme dryness of the air in a heated room which produces the commonly noticed discomforts, such as extreme thirst, a parched feeling in the nose, throat, and a headache, and which has been a contributing cause of many throat and pulmonary diseases.

Elaborate tests have been made to determine the effective temperature range most comfortable to the majority of people. This has been termed the comfort zone and for persons normally clothed and slightly active may be taken as between 63 degrees and 71 degrees effective temperature. The comfort line is that effective temperature reported comfortable by the largest percentage of people tested and is 66 degrees effective temperature.

For persons stripped to the waist the comfort zone lies between 61 degrees and 69 degrees effective temperature, and 64 degrees may be taken as the comfort line.

Tables of effective temperatures for ordinary heating and ventilating work, and also for industrial applications are available in the A. S. H. & V. E. Journal, July, 1924, and January, 1925, and also in the second edition of "Fan Engineering."

In order to understand more clearly the value of effective temperature, the accompanying chart is given, showing three effective temperature lines for 50, 70 and 90 degrees and the three velocities of 200 and 300 feet per minute. It will be noted that the method of naming the effective temperature has been purely arbitrary. At saturation the dry bulb, wet bulb and dewpoint temperatures coincide and this has been chosen to designate the degrees of effective temperature in still air. The solid lines are for persons normally clothed while the dotted lines are for subjects stripped to the waist. Thus, for a person normally clothed all conditions represented, say, by the solid 70 degrees effective temperature lines, will be equally comfortable. Likewise, for a person stripped to the waist all conditions represented by the dotted 70 degrees effective temperature lines will

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How Great Is Your Mathematical Power?

Solutions of the Problems That Appeared in the October Issue

PROBLEM 1

TWO buildings on opposite sides of an alley, have their walls parallel to each other and perpendicular to the plane of the alley. A 40 foot ladder is placed with its foot against one building and leaned against the opposite building. A 30 foot ladder is placed with its foot against the other building and leaned against the opposite building. The two ladders cross at a point 15 feet above the alley. How wide is the alley? (Fig. 1 illustrates the position of the ladder).

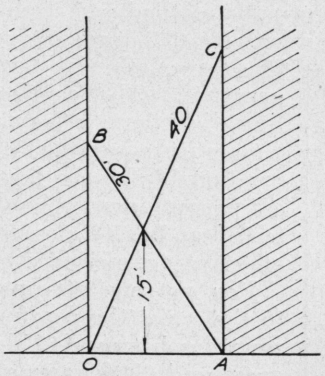


FIGURE 1

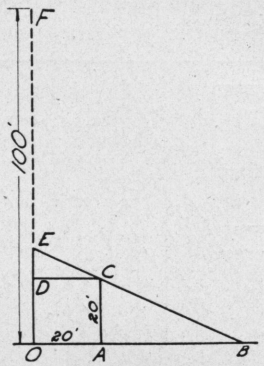


FIGURE 2

Solution by Dr. Sousley

Let width of alley OA=a.

Equation of line OC: $y=\frac{(1600-a^2)^{\frac{1}{2}}x}{a}$

Equation of line AB: $\frac{x}{a}+\frac{y}{(900-a^2)^{\frac{1}{2}}}=1$

Eliminating x between these two equations and solving for y:

$$y=\frac{(900-a^2)^{\frac{1}{2}}\ (1600-a^2)^{\frac{1}{2}}}{(900-a^2)^{\frac{1}{2}}+(1600-a^2)^{\frac{1}{2}}}=15$$

since the common ordinate is 15.

Letting $a^2=t$

and $100=h$

$(9h-t)^{\frac{1}{2}}\ (16h-t)^{\frac{1}{2}}=15\ (9h-t)^{\frac{1}{2}}+(16h-t)^{\frac{1}{2}}$

Squaring twice to eliminate radicals and collecting terms:

$t^4-41\ t^3h+575.5\ t^2h^2-3091.5\ th^3+4784.0625\ h^4=o$

Solving this equation by Horner's Method:

$t=2.579h$

Therefore $a=(257.9)^{\frac{1}{2}}=16.06$ ft.

PROBLEM 2.

Here is an easy problem that anyone should be able to solve.

A flag pole 100 feet high stands 20 feet from a wall which is 20 feet high. During a storm the pole is broken. The upper part falls across the wall and at right angles to it so that when the tip of the pole is on the ground, the member just touches the wall. The two parts do not separate but make an angle with each other as though they were hinged at the point of the break. How far above the ground did the break occur? (Fig. 2 illustrates the initial and final positions of the flag pole).

Solution by Allen G. Stimson.

Let height of point of break OE=a.

$$\text{Line } \overline{OB}^2=(100-a)^2-a^2$$
$$=10{,}000-200a+a^2-a^2$$
$$=100\ (100-2a)$$
$$OB=10\ (100-2a)^{\frac{1}{2}}$$

Triangle ECD is similar to triangle EBO.

$$\frac{a}{10\ (100-2a)^{\frac{1}{2}}}=\frac{a-20}{20}$$

$$\frac{a^2}{100-2a}=\frac{a^2-40a+400}{4}$$

$$4a^2=(100-2a)\ (a^2-40a+400)$$

$$a^3-88a^2+2400a-20{,}000=o$$

Solving this equation by Horner's Method:

$a=28.894$ ft.

PROBLEM 3.

Five men stranded on a desert island, gather cocoanuts for three days, while awaiting rescue. They also acquire a pet monkey. They plan to divide the cocoanuts evenly when they leave the isle. On the third night a ship arrives. One of the five men, becoming suspicious of the others, decides to take his fifth and secrete it. In doing so, he finds the pile divisible by five with one cocoanut remining. In strict honesty, he gives this odd nut to the monkey and takes away his share.

After this man retires, the second awakens and decides to abscond with his share. Then the other three do the same, consecutively. Each of the five men finds the pile divisible by five except for one nut which in each case is given to the monkey. That is, each man takes one-fifth of the quantity, minus the one given to the monkey, left by his predecessor after the latter has taken his fifth of the quantity, minus the one given to the monkey, left by his predecessor, etc.

After the fifth man has taken his portion and given the monkey one, the number of cocoanuts then remaining in the pile is evenly divisible by five. How many cocoanuts were there in the original pile gathered altogether by the five men in the three days?

Solution by Dr. Sousley

Let x=Number of cocoanuts in original pile.

Let a, b, c, d, e=Number of cocoanuts taken in order by each of the five men.

Let y=Number of cocoanuts remaining.

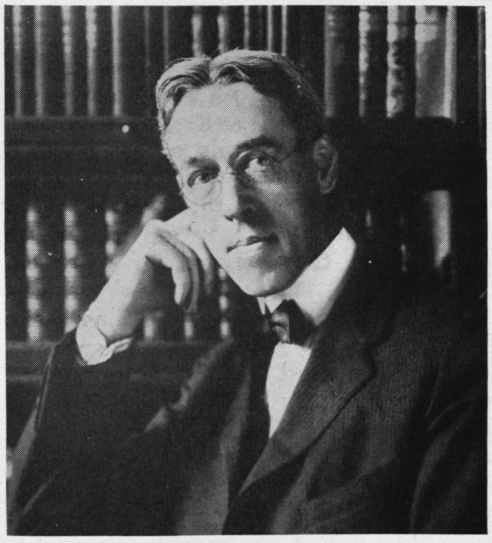
(Continued on page 56)

ROBERT LEE WILSON, '92

Assistant to President, Westinghouse Electric and Manufacturig Company

MR. WILSON'S education and experience have fitted him admirably for the position of Assistant to President of the Westinghouse Electric and Manufacturing Company. This was his education: High School at Shelbyville, Illinois, where he was born; one year at University of Iowa, and three years at Rose Polytechnic Institute, where he received his degree of B. S. in M. E. Then he engaged in a year's post graduate work in electrical engineering at Johns Hopkins University.

In the spring of 1893, he came to the Westinghouse Electric and Manufacturing Company, where he has found the opportunity he sought. After a few months apprenticeship, he worked as a draftsman. From 1895 to 1898, he was inspector in the shop, gaining a knowledge of tools and workmanship, which has been of great value to him. From 1898 to 1901, he was road engineer for the Westinghouse Company. Then for two years he was District Engineer in New York, where he handled the electrification for the Interboro Rapid Transit Company and other big jobs. The Interboro, the first subway in New York, has developed into a transportation system of tremendous importance. Mr. Wilson had charge of this pioneer installation—the first of its kind. The 200 hp. railway motors put in the cars were the biggest motors ever placed on wheels and at that time, were motors of exceptional size.



ROBERT LEE WILSON

From there he was recalled to East Pittsburgh as Superintendent of Construction until 1906 when he was appointed Superintendent of Railway Construction. This position was created at the time the Company received large railroad electrification contracts. Mr. Wilson was the man to handle the tremendous task.

As Superintendent of Railway Construction he handled the biggest job the Westinghouse Company ever undertook—the electrification in 1906 of the New York, New Haven and Hartford Railway from New York to Stamford, Conn. This system was the first in the country to use 11,000 volts a-c. A three-wire system of transmission was fed by the generating station over the contact system with auxiliary feeders. The installation consisted of 590 track miles of electrified railroad and contained the largest electrified yard in the world. There were 117 locomotives, 35 multiple-unit motor cars and 65 multiple-unit trailer cars placed in service.

These locomotives were designed for both a-c. and d-c. at 11,000 volts. In the city, they operated on a direct-current third rail, and on an overhead catenary single-phase alternating-current outside the city. The overhead catenary construction of trolley was the first in the country—and probably the only—but Mr. Wilson made it work.

This pioneer installation has made history. Everything was new—nothing had been similar, even on a smaller scale. There were difficulties to be met and they were met continually. There were no experienced operators in the employ of the railroad. The Westinghouse Company was called upon to operate the lines, and this the Company did for two years until the railroad crews were qualified to operate the electrified system. Throughout this trying time, where much reconstruction work was necessary, R. L. Wilson wended his quiet way and finished with a clean record.

Also, the electrification of the St. Clair Tunnel was handled by him in the same efficient manner. This tunnel, over a mile in length on the Grand Trunk Railroad, runs beneath the St. Clair river connecting Port Huron, Michigan, and Sornia, Canada. In May, 1908, six 3300 volt single-phase electric locomotives, weighing 66 tons each, were placed in operation in this tunnel. They have been in constant service since. Pumping stations were placed at each portal to pump the water from the tunnel. Mr. Wilson supervised the entire installation;—the power plant, the electrification of the line and the drainage pumping station.

The change from steam to electric operation was accomplished without difficulty, delay or inconvenience. Before the equipment was placed in operation the engineers and firemen who operated the steam locomotives were given instructions on the operation and maintenance of the equipment. The continuance in the service and the results these men have obtained, can safely be taken as an indication of the satisfactory surroundings pertaining to electric operation.

Recalled again to East Pittsburgh, Mr. Wilson took up the work of Superintendent of Railway Department in the factory, where his outside experience proved especially valuable. He became Assistant General Superintendent, in which position he had a great deal to do with employment and welfare

(Continued on page 50)

Research and Progress

Conducted by Lee C. Kelsey.

Wave Distribution in Wireless Transmission

TELEGRAPHIC communication over greatest possible distances was the leading attraction of the scientists in the early days of wireless transmission. Tests and observations brought to their eyes the fact that communication over 200 miles was uncertain and that the conditions varied with the time of day and location of transmitter and receiver. Scientific research has shown that much of the variation of the waves is due to the fact that the wireless waves are propagated to great distances and round the curvature of the earth only by traveling through the upper portions of the earth's atmosphere. The transmission of these "atmospheric" waves is subject to the influence of the sun's radiation and the earth's magnetic field in a medium quite uncontrollable from the earth's surface.

For satisfactory broadcasting it is necessary to provide at the receiver a radiated field of constant strength. To establish reliable service under conditions it is necessary to rely upon the waves from the transmitter that travel straight along the earth's surface. These waves are not influenced by the conditions of the atmosphere, but by the absorption by the portions of the earth's crust over which they travel.

The extent of this absorption in overland transmission depends on the contour of the land, the dampness and nature of the soil, and the trees and ground vegetation. In England, the effect caused by the contour of the land was noticeable as close as 15 miles from the tranmitter. This absorption tends to limit the distance of transmission and the clearness and probably is one of the causes of "fading" of radio signals.

Research and experimentation has proven that the field intensity of radio waves are proportional to the square root of the energy, thus we see that the intensity decreases inversely as the distance from the transmitter. If the conductivity of the earth's surface is not perfect there will be a certain loss of energy due to the heating effect of the eddy currents set up in the earth by the waves traveling through it. This means that the energy of the waves will then decrease with the distance from the transmitter at a greater rate than for a perfect conductor.

We find the loss of energy grows as the resistance of the earth's surface increases. By having the waves travel in the upper regions, the carrying strength is considerably farther and more power strength is transmitted. If, however, the waves travel over the sea, the loss is a minimum due to superior conductivity of the water.

The results of experimenting thus with high and low wave length stations located in all possible kinds of sites have lead to a decrease in the number of broadcasting stations located in large cities, near forests and in regions where the content of the soil will tend to lower the strength and power of the wireless waves. Many large broadcasting stations now broadcast by remote control from a local studio, having the transmitting station located at a distant point from the studio and usually on high, open country.—*Abstract*, "*Television.*"

Chromium Irons and Steels

THE alloys of iron-chromium, established their status in the chemical industry three years ago when this alloy was selected for use in a nitric acid plant. So successful has been the iron-chromium alloy that it is now a recognized factor in the materials of similar manufacturing operations.

The corrosion-resisting properties of this alloy have been known for many years. As early as 1914, stainless cutlery was introduced in England. This application covered iron-chromium alloys containing sufficient carbon to confer hardening capacity, the alloys then being suitable only for cutlery, tools and the like. Chromium is noted for its affinity for carbon, forming, as an alloy, various double carbides of iron and chromium, all conspicuous for their hardness. If more chromium is added than needed to meet the demands of the carbon, it combines with the iron, forming a solid solution which, if the chromium content is sufficiently high, produce the corrosion-resisting qualities.

The hardness of the stainless steel, and the fact that it will harden in the air while still at a high temperature, limits its working ability and the production of intricate shapes, sheets and tubes is commercially impossible. If carbon is increased with the chromium in the manufacture, the alloy will show increase in its hardness. These high carbon, high chromium alloys are very hard, are practically unmachineable, and can be produced only in the form of castings. Thus the important ratio of the carbon to the chromium content not only affects the degree of its corrosion-resistance but also its physical properties.

The iron-chromium alloys group themselves into several classes, resulting from the variation in their physical characteristics due to addition of other elements and by proportion to their constituents. Listed they are:

(1) Stainless Steels—Iron chromium steels containing sufficient carbon to confer hardening capacity and requiring heat treatment for development of proper corrosion resistance. They contain 0.30 percent carbon and 13 percent chromium. Notable for hardness and wear-resistance, this class of the alloy does not soften materially at temperatures under 950 to 1,000 degrees Fahrenheit.

(2) Mild Stainless Steels—The low carbon con-

tent steels with distinct hardening capacity, heat treatment desireable but not necessary for the development of corrosion resistance. The content is 12 to 15 percent chromium with 12 percent carbon. The alloy can be machined and is used in the U. S. Navy Department as standard for steam turbine blading and shrouding.

(3) Stainless Irons—Contain from 16 to 20 percent chromium with carbon content 10 to 12 percent. The ratio of chromium to carbon being unusually high, the alloy shows virtually no hardening capacity but excellent corroison resistance at any condition of heat treatment. The alloy is quite ductile and can be worked both hot and cold. The usefulness of the alloy in the nitric acid industry has definitely been established and has practically revolutionized the manufacture of the acid. This class of alloy is also resistant to the milder acids of fruit and is therefore used in machinery for canning and preserving.

(4) Chromium Irons—The alloy of this class has chromium content of a minimum of 20 percent. They are produced as castings and rolled products. With carbon exceeding 0.50-0.75 percent the alloys become increasingly harder. The chromium-irons are used for heat resisting castings, such as furnace parts. They can withstand temperatures of 2,100 degrees Fahrenheit over long periods. When the alloy is used for wear and abrasion resistance the carbon will run from 2.25 to 2.75 percent. However these alloys are rather unsuitable when heavy stresses must be maintained at high temperatures due to the peculiar grain structure in the metal.

Summarizing briefly the important characteristics, we find them to be resistance to corrosion, resistance to nitric acid, the oxidizing agents of organic acids, sea water, gasoline, sugar and alkaline solution, and ammonia. They are highly resistant to sulphur and its compounds. The co-efficient of thermal expansion is slightly less than that of steel and this is usually advantageous, particularly in equipment which must be subjected to fluctuating or widely varying temperatures.—*Abstract "Chem. & Met. Eng."*

A Marble Dam

TO provide Athens, Greece, with a new source of water supply American engineers have designed and constructed what is the world's only marble dam. It is a solid concrete wall, 150 feet wide at base and 15 feet wide at the top, faced with pure white marble quarried from Mount Pentelicus. The dam is 900 feet long and 165 feet high, with 675 feet elevation above sea level. The structure contains more than six million cubic feet of masonry and concrete, 40,000 tons of Portland cement and more than 10,000 tons of Santoris earth.

A roadway has been built on top of the dam to provide for traffic across the valley. The dam will hold back the waters of two rivers, and will form the artificial lake of Marathon, which when full will have an area of more than 25,000,000 square feet. The capacity is estimated at more than a billion cubic feet of water.

This new supply will do away with the old inadequate means used in the past to bring water to Athens. For more than 1,800 years they have been using the aqueduct built by Hadrian. In spite of its great age it was found to be still in excellent condition when the American engineers examined it.

Considerable difficulty was encountered at first when the engineers introduced American working methods because the Greek workman insisted upon their usual three hour siesta from noon until three o'clock. Gradually, however, they have accepted the American period of one hour. The dam will probably be finished some time this year. The Greek government is already planning for the dedication early in 1930.—*Abstract Popular Science Monthly.*

Bauxite Mining

IN 1915 bauxite (pronounced bo'-zite) was identified in Dutch Guiana, but it was not until late 1916 that active prospecting for this ore began. During the war the cheaper European ores were not available to American consumers and the American aluminum industries turned to the Guianas as the most accessible field for prospecting. Since then several companies, both American and foreign, have had parties in the Guianas, but at present there are only two in operation.

Even in this field the inaccessibility of the locality and the frequent heavy rains combined with the poor labor supply make construction work very difficult. The first shipments of ore were not made until 1922 and then only a few tons of the crude bauxite ore. In 1927 a washing and drying plant was completed which removes much of silica. It has been found that enough is saved in freight by washing to pay for the operation.

The bauxite deposit averages eleven feet in thickness with an overburden from zero to ten feet, of loose ,loamy, chocolate colored soil. Before the plant was constructed this overburden was removed by hand, the laborers using flat shovels and brooms. Steam shovels are now used.

Vertical holes are drilled into the bauxite by hand, one man drilling about three feet an hour. Two men are used when a hole over fifteen feet is needed. The holes are chambered and blasted with a charge of Durox or black powder. Electric detonators are used when electric firing is done. Due to the rapid deterioration of explosives in the more temperate latitudes, ammonia powders were found to be unsuitable for use. "Rack-a-rock," an explosive made of marabane oil and potassium chlorate, was very successful, as it could be made up as needed without fear of deterioration. About 10 ounces of powder is needed per ton of crushed ore.

The ore is dumped from the cars upon trommel screens with two inch openings and is washed with jets of water. About 1,300 gallons of water are used per ton of ore washed. The undersized from the trommel screens goes to the collection sump. From here the mixture of ore and water is pumped to a distributing hopper, carried to the washers and cleansed of all but two percent silica. Seventy percent of

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Published Monthly by the Students of the Rose Polytechnic Institute

The Rose TECHNIC

A Magazine Pertaining to Engineering and Allied Sciences

Member of Engineering College Magazines Associated

The Recovery of Dry Cleaners' Solvent

(Con'inued from page 33)

general use. All three distillation methods are batch processes and must be supplemented with large storage tanks.

Chemical Clarification. This method, although more complicated than the others, is in reality very easy to operate. Such operation costs are low, no power being required except a very small pump and the only materials used being about 50 pounds of caustic soda and 20 pounds of Decolorizing Carbon for an average plant per week. It turns out solvent of a better quality than any other with the possible exception of the steam distillation method and there are no "cracking" effects as in the other stills. Its chief objection is that mineral oils and greases are not removed and may, in time, build up to a troublesome value. It is useless in a plant which cleans overalls, etc.

As the solvent leaves the washer it is led through a coarse screen where the pins, buttons and other coarse materials are removed. A small pump then forces it to an air-separator on the roof where entrapped air is allowed to escape. This lowers the fire hazard. Gravity then forces the gasoline through a specially designed saponification tank were the oils are changed from gasoline-soluble to water-soluble soaps through the action of a solution of caustic soda. There is also some activated carbon suspended in this caustic solution and it is claimed that color is thereby removed. A second tank, containing clear water, removes any caustic or carbon coming over from the first. A large underground settling tank next allows suspended matter to settle out and a final filter of fine silk completes the removal of small solid particles. Thence back to the washers.

Such a system has many advantages not readily apparent. It has large capacity and low cost per unit of solvent recovered. It saponifies fatty acids, changing them from gasoline-soluble to water-soluble soaps, causing them to settle out and carry the dirt with them. The decolorizing carbon, it is claimed, absorbs some of the mineral oils and greases, but this is somewhat doubtful. Acidity in the solvent is neutralized and rancidity is prevented.

From the foregoing, it is evident that no single process is sufficient by itself. Pressure filtration, due to low cost of operation, is generally used in conjunction with either a vacuum still or a chemical outfit. The usual procedure is to merely filter the solvent for the first five days of the week and then run the whole supply through the chemical system or distill it in a vacuum still on Saturday.

The recovered solvent must be free from grease and moisture and should be water-white or nearly so. The presence of grease may be shown by shaking some of the solvent with alcohol and allowing the two to separate. The grease, if present, will appear as globules at the interlayer. Moisture may be shown by dropping a few crystals of potassium permanganate into a little of the solvent, the characteristic color of the permanganate indicating water. Color, unless high, is not important. In the cleaning of white flannels and georgettes, however, it is sometimes fatal, causing a creamy color to set on the fabric. Only water-white solvent should be used on these materials.

There are many things that are yet to be learned in this industry and the Dying and Cleaning Institute in Washington, D. C., is supported by the more progressive of the Dry Cleaners of the country for research into their important problems. This organized research by a large number of small operators is an excellent example of the progressive policy of the American Business Man.

ATHLETICS

ROSE 19 — HANOVER 7

PHIL BROWN'S Fighting Engineers annexed their second successive grid batle of the season Saturday, October 19, when they decisively defeated Hanover 19 to 7. The Rose eleven outplayed and outfought the heavier Hanover team and the outcome was not in doubt after the first five minutes of play. It was a glorious homecoming victory and exceeded the hopes of the most ardent of fans.

With Dean and Hill displaying some clever ball carrying immediately after the kickoff the ball was placed within scoring distance just one minute after the opening whistle. Within two minutes Billy Nichols caught a pass from Dean for the first touchdown.

The suddenness of the Rose attack surprised the Hanover team and the half was nearly over before they knew what was going on. The Brownmen had possession of the ball most of the time during the first half, scoring twice and being stopped three times when they were within 20 yards of the goal line.

Dean returned the kickoff to the 40 yard line and then circled the end for 35 yards and Davy went off tackle for 8 yards. Hanover took time out, Davy followed by crashing off tackle for first down. Hill followed by making another first down. Dean made 5 yards around end and Hill made two through center. Dean then threw a pass to Nichols who made the touchdown. Nichols then added the extra point with a neat dropkick.

The Hilltoppers displayed more punch after the second half started and battled the Engineers on practically even terms during the third period. Both teams had chances to score but fumbles and penalties kept the goal line from being crossed.

After the third quarter was under way Rose was forced to kick after being held on their own 30 yard line and Taggert was down on his own 25 yard mark when Nichols got a long punt away in neat style. After two line plays had failed, a pass, Higgs to Beamer, was slipped over on the Rose athletes, and Beamer, who snared the pigskin, sprinted 60 yards down the field for Hanover's lone touchdown.

The Engineers came back in the fourth quarter fighting mad, and after Gillette intercepted a Hanover pass Rose started down the field for their final touchdown. With Hill, Dean, and Davy ramming the line and circling the ends, Rose pushed its way to the Hanover four-yard line, from where Hill thundered off tackle for the score, Nichols' drop kick was wide.

For Rose, "Sandy" Hill, who reeled off 35 and 50 yard runs, mixed with numerous shorter gains, was the outstanding ball carrier of the game. On the line "Spud" Kruzan played the best game, smearing everything that came his way and some that went to the other side of the line.

Although outweighed several pounds to the man, the Fighting Engineers outplayed their heavier rivals. The Brown-coached machine registered 14 first downs to their opponents 6 and gained 243 yards to Hanover's 170 in scrimmage.

Line-up and summary:

Rose Poly, 19.		Hanover, 7.
Gillet	L.E.	Wallin
Pratt	L.T.	Dill
Bruce	L.G.	Easton
Simpcoe	C.	Rockwell
Tonetti	R.G.	Abbott
Kruzan	R.T.	Telly
Hilton	R.E.	Nabb
Nichols	Q.B.	Anderson
Hill	L.H.	Beamer
Dean	R.H.	Higgs
Davy	F.B.	Taggert

Score by quarters:

Hanover	0	0	0	7— 7
Rose Poly	7	6	0	6—19

Rose Poly scoring—Touchdowns: Nichols, Dean, Hill. Point after touchdown: Nichols, dropkick.

Hanover scoring—Touchdown: Beamer. Point after touchdown: Buck, placekick.

Substitutions—Rose: Dicks for Hylton, Evans for Tonetti, Lowthers for Pratt, Mendeen for Bruce, Ogan for Simpcoe, Schaak for Gillett. Hanover: Abbott for Easton, Garriot for Abbott, Buck for Beamer, Beamer for Anderson, Thayer for Telly, Willis for Rockwell.

Officials—Referee, George, Otterbein; umpire, Paul, Butler; head linesman, Julius, Indiana.

ROSE 12 — INDIANA CENTRAL 6

ROSE POLY defeated Indiana Central at Indianapolis, Saturday night, October 26, to extend their winning streak to three games. The first half was marred by frequent fumbles by both teams, two of the fumbles preventing Rose from scoring twice. Rose had the ball in Central's territory most of the time and it took all that Central had to prevent the Fighting Engineers from scoring. The first half ended with the score 0-0, with Rose outplaying the Greyhounds in every department of the game.

The second half opened with a rush as Rose Poly was fighting mad after a long talk from Coach Phil Brown. Davy kicked off a beautiful 55 yard placekick to Smith, who ran it back 25 yards. After an unsuccessful end run and linebuck, Moore attempted to kick but Kruzan broke through the line and blocked the kick. Rose got the ball on the 27 yard line. Hill made 21 yards on two off tackle plays, placing the ball on the seven yard line. After two line plays had failed, Dean passed 20 yards over the goal line to Hill for the first touchdown. Nichol's dropkick failed. The score was 6-0, Rose.

Central got its touchdown in the same quarter

when Furgison made a beautiful 40 yard end run and then a long pass from Lemme to Smith, who had an open field, gave Central the touchdown that made the score 6-6. Central's placekick was blocked by Gillett.

In the last quarter Rose had the ball on the 50 yard line. Hill went off tackle for 25 yards and Central was penalized 15 yards for holding, which placed the ball within seven years of the goal line. Dean made five yards on two line plunges and Davy put the ball over on two more plunges. Tonetti's placekick was a failure. The score stood 12-6, Rose.

Central tied several passes as the game drew to a close. When the gun sounded Rose had the ball and was on the way for another touchdown.

For the losers, O. Smith, Lemme and Furgison played the best game. For Rose, Hill starred an offensive, while Davy and Dean played a wonderful defensive game. The entire line played a great game with Kruzan, Tonetti and Gillett outstanding. Nichols' punting was a feature of the game. He outpunted his opponent 10 yards to the punt.

Line-up and summary:

Rose, 12.		Indiana Central, 6.
Gillett	L.E.	Rider
Pratt	L.T.	H. Smith
Bruce	L.G.	Moore
Ogan	C.	Leonard
Tonetti	R.G.	Reece (C)
Kruzan	R.T.	Vance
Dicks	R.E.	Nowlings
Nichols	Q.B.	O. Smith
Dean	R.H.	Furgison
Hill	L.H.	Bruight
Davy (C)	F.B.	Loudermilk

Score by quarters:

Rose	0	0	6	6	—12
Indiana Central	0	0	6	0	— 6

Scoring—Touchdowns: Rose, Hill, Davy; Central, Smith.

Substitutions—Rose, Simpcoe; Indiana, Lemme, Settlemeyer, Light and Loveless.

Officials—Miller, Carnegie Tech, referee; Sidenstick, Wabash, umpire; Julius, Indiana University, head linesman.

ROSE 12 — EVANSVILLE 7

ROSE broke into the winning column Saturday, October 12, by defeating the Evansville Aces 12 to 7. The Fighting Engineers were outweighed ten pounds to the man but their determination and superior physical condition brought them out on top.

As the game opened it seemed as though Rose was doomed to defeat, when a Rose punt was blocked and rolled behind the goal line where Hartke fell on it for the first touchdown of the game. A Rose lineman was offside and the try for point was awarded Evansville, making the score 7 to 0.

Late in the first quarter Nichols punted to Dosset who fumbled on his 15 yard line. Kruzan of Rose fell on the ball. Hill made five yards through the line and then followed with two more. Dean then made first down. Evansville's line strengthened and held Rose for downs thereby ending Rose's first threat.

Early in the second quarter the Engineers started a drive down the field that was not stopped until Rose had scored a touchdown. Tonetti missed the try for point and the score at half-time was, Evansville 7, Rose 6.

After a punting duel in the third quarter by Nichols and Dosset, Hill received the ball on the 41 yard line. After several plays Dean sprinted around Evansville's end and was not downed until he reached the 15 yard line. Davy made first down on the third play and Dean made the touchdown after several plays had placed the ball on the three-yard line. Tonetti's kick for the extra point was low.

In the last quarter the ball changed hands many times, and in the last minutes Evansville took to the air but failed to gain as the Rose backs smothered all of them. The game ended with Tonetti breaking up a long Evansville pass.

For the Engineers the fleet ball carrying of Sandy Hill and Dean featured. Nichols outpunted Dossett and Davy did a beautiful job of backing up the line. Of the linemen "Spud" Kruzan played the best game. He broke through the Evansville forward wall time and again to throw the backs for losses. Bruce played his usual consistent game at guard. For Evansville Dosset and Dick were the outstanding men.

Line-up and summary:

Rose Poly, 12.		Evansville, 7.
Gillett	L.E.	Hartke
Pratt (C)	L.T.	Stoltz
Bruce	L.G.	McMurty
Ogan	C.	Hollis (C)
Tonetti	R.G.	A. Fitzsimmons
Kruzan	R.T.	Warren
Hylton	R.E.	Kneer
Nichols	Q.B.	Crisp
Hill	L.H.	Fritsch
Dean	R.H.	Dossett
Byrne	F.B.	Dick

Score by quarters:

Evansville	7	0	0	0	— 7
Rose Poly	0	6	6	0	—12

Scoring—Touchdowns: Dean (2), Hartke.

Substitutions—Rose Poly: Dicks, Simpcoe, and Davy. Evansville: Dryer and Porter.

Officials: Referee, Vaughn Russell, Indiana State Normal; umpire, H. Hungate, Butler; head linesman, Ben Watt, Wabash.

EARLHAM 20 — ROSE 0

AFTER keeping Earlham on the defensive throughout the first half the Rose team blew up in the final half to close 20 to 0. In the second quarter Rose made a serious threat carrying the ball to within one foot of the goal line but a fifteen yard penalty crimped the spurt.

Earlham kicked off to Rose to start the second half and Hill returned the ball 65 yards. A Rose back then fumbled and Earlham recovered. This was the last time Rose threatened. Earlham made their three

(Continued on page 46)

George H. Freers, '08

George H. Freers is Made Chief Engineer of Marmon

AS a result of seventeen years of hard work and accomplishment, Mr. George H. Freers, of the class of 1908, was appointed chief engineer of the Marmon Motor Car Company of Indianapolis, Indiana.

Mr. Freers' advancement was announced October 19, by G. M. Williams, president of the Marmon Motor Company. For the past five years Mr. Freers has been chief assistant to Col. Howard Marmon, vice president in charge of engineering.

Mr. Freers is a member of the board of control of the Indiana Section of the Society of Automotive Engineers and formerly was chairman of that section. He graduated from Rose Polytechnic Institute in 1908 and has since been associated with the Interstate Automobile Company, the Alden, Sampson Truck Company, Packard and General Motors.

Mr. Freers is known as the type of engineer who personally tests his own new ideas and those of others rather than rely on theory. Mr. Freers is 43 years old and lives at 5124 East Walnut Street, Indianapolis, Indiana.

'03

Mr. Carl J. Kiefer of the class of '03 observed his 47th birthday October 14. Since leaving Rose Mr. Kiefer has made a very commendable record both for himself and for Rose.

In 1905 he received his Master of Science degree and three years later he was awarded the degree of Mechanical Engineer.

Mr. Kiefer has been associated with the General Electric Company, the Toledo, Bowling Green, and Southern Traction Company, the Milford and Blanchester Traction Company, and the Reliance Engineering Company, of which he became sole owner. During the World War he was supervising engineer for the Fifth Naval District at Yorktown, Va., in charge of naval base construction.

Mr. Kiefer is a member of a number of clubs and associations, among them being the American Society of Mechanical Engineers, the American Institute of Electric Engineers, and the American Society of Heating and Ventilating Engineers. He has offices at 901 Schmidt Building, Cincinnati, Ohio.

'04

Ferdinand W. Hahn of the class of '04 who formerly was with the American Steel Foundries, Chicago, Ill., is now with the Pullman Car and Manufacturing corporation.

'12

Announcement has been made of the formation of the firm of Wilson, Dowell, McCanna and Rehm of Chicago, Ill., for the continuation of the practice of patent law. Mr. Roland C. Rehm of the class of '12 is a member of this firm.

'10

Carl G. Planck, ex-'10, has recently received his B. S. degree from Rose Polytechnic Institute. Mr. Planck was unable to complete his work with the class of '10, but having recently done so, the Institute granted him his degree.

'23

James B. Connelly, who is with the Kentucky Actuarial Bureau, has been transferred from Louisville, Ky., to Ashland, Ky.

'25

Howard L. Newton, formerly with the Milwaukee Electric Railway and Light Company, has taken a position as assistant engineer with the Pressed Steel Tank Company of West Allis, Wisconsin.

Orville M. Dunning, who is with the Sonora Phonograph Company, has been transferred to Buffalo, N. Y.

'26

Theodore S. Moench of the class of '26 has been transferred to Buffalo, N. Y. He is working for the American Telephone and Telegraph Company.

'27

Paul E. Dufendach, formerly with the Kentucky Pipe Line Company of Prestonberg, Kentucky, has taken a position with the Kentucky-West Virginia Gas Company in Ashland, Ky.

'28

Arthur C. Keiser, with the Worthington Pump Company, is now sales engineer in Chicago, Illinois. Mr. Keiser's territory is in Wisconsin but he works out of Chicago.

Hubert W. Swartz, formerly with the Metzger Iron Works of Evansville, Indiana, has accepted a position as assistant on the engineering corps with the Pennsylvania Railroad Company at Terre Haute, Indiana.

Morris Guggenhiem has accepted a Junior Metallurgist appointment at the Mississippi Experiment Station of the United States Bureau of Mines at Rolla, Mo.

'29

Carl R. Ploch, with the Logan Company, has been transferred from Louisville, Ky., to Chicago, where he is office manager.

As the nineteenth of October was homecoming for

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CAMPUS NOTES

The Rose Show

THE assembly of Oct. 17 was devoted entirely to a general discussion of plans for the second biennial Rose Show to be held next term. Prof. Knipmeyer, who is general chairman of the show and to whom much credit must go for the success of the first show as its chairman, had charge of the assembly. The program consisted of speeches given by various members of the faculty and several seniors. Every one who talked had taken an active part in the first show, and they indicated that more activity from them would be shown for the coming show. Every talk approached the subject from a different angle, but the keynote of all was the desire for the hearty co-operation and hard work by everyone in order to make this Rose show bigger and better than ever.

The Rose show will necessitate many hours of hard work and worry on the part of everyone, but what worth-while undertaking of such importance does not? Because of that large amount of work, is there any student who does not want the show or who will not give as much time and effort as is asked from him in order to make it a success? We do not believe there is a single such student in school. Although the freshmen and sophomores lack the experience of the upper-classmen, it is believed they will make this up by an abundance of enthusiasm.

Here is a chance to advertise Rose! It is a chance to show all who care to come, just what Rose is doing and what we are attempting to learn. It is a big job, but here is a chance to show we are equal to such tasks. When the time comes, therefore, let every individual do what is expected of him to the best of his ability and with the greatest extent of co-operation. Also, advertise this show.

Dorm Doings

THE dormitory presented a gay scene Saturday night, Oct. 26. The occasion was a dance sponsored by the dormitory students. Flanagan's Speed Boys furnished the music for the dance, which was attended by a large and enthusiastic group. Chaperones for the dance were Mr. and Mrs. Hopkins. To the efficient social committee, composed of Gilbert, Gehres ,and Wells, is due the success of the dance.

Homecoming

THE most successful Rose homecoming in recent years was held this year on Oct. 19. To show the football team the backing it has from the student body, a pep meeting was held Friday night. A big bonfire was made near Twenty-fifth and Wabash avenue. Yells for the team were given, several songs were sung, and then cider and doughnuts, furnished by the freshmen, were passed around. From the bonfire the crowd disbanded to reform for a parade starting at Ninth and One-half and Ohio streets. The parade consisted of the Rose military band, Rosie with her pajama-clad guardians, and a large percent of the rest of the student body. The students gave cheers and songs at every street corner and wound sinuously in snake dance from corner to corner.

The next day the team responded with its second victory of the year, beating Hanover with a score 19-7. It was a fine game played before a good crowd, in which there were a goodly number of Rose graduates.

Then, last of all, to end a great homecoming in the best possible way, a dance was held in the gymnasium.

Assemblies

TWO reels of motion pictures titled, "The Story of Bakelite," were run through at the assembly of Oct. 10. These reels pictured the raw products, manufacture, and uses of Bakelite. The many uses of Bakelite and their variety was a surprising bit of information to nearly all who saw the picture, and the whole picture served to impress the large part that chemists are now playing in industry directly and in the public life more or less indirectly.

After the picture Maurice Piker, leader of the band, spoke about plans for the homecoming pep session. Coach Brown also talked. He praised the team and declared that its prospects of victory were good.

Radio Club

THE Radio Club held an election on Oct. 8, and the following officers were chosen: Ted Cliff, president; Royer Blair, vice president; Paul Froeb, secretary-treasurer, and Clifford Lamb and Charles White, advisory board. Professor Hieber was chosen faculty advisor.

At the meeting a week later plans for the coming year were discussed, and it was planned to have a banquet in the near future together with an inspection of the DeForrest sound apparatus which was recently installed in the new Orpheum theatre in Terre Haute. As its contribution to the Rose show, the club plans to exhibit a television receiver and transmitter. Such an exhibit has never been seen in Terre Haute, and it will undoubtedly be one of the outstanding displays of the show.

A. S. M. E.

AT the last monthly meeting of the local chapter, Davy Morwood, Terre Haute, senior mechanical, was the principal speaker. Taking as his subject, "Recent Radio Developments as Applied to

(Continued on page 51)

FRATERNITIES

ALPHA CHI SIGMA

MR. H. E. WIEDEMANN, Rose, '03, and at the head of Alpha Chi Sigma in the Mississippi district, paid Iota a visit recently. He attended the homecoming football game in company with members of the local chapter. That night a meeting was called in which important business of the local chapter was discussed.

Monday night, October 21, a professional meeting was held at the house, with almost perfect attendance. The members of the faculty in Chemical Engineering were also present, as was Mr. John Sanford, '15. Prof. R. C. Kintner first told us what an engineer has to expect when he goes into the world. He illustrated his talk by interesting incidents from his own experience. Mr. Koch then gave us a picture of the fraternity at Wisconsin, where the first chapter of Alpha Chi Sigma was organized in 1903. Dr. White next discussed the problem the student faces who is forced to drop out of college due to financial reasons, and who must either lay out a year to earn enough money to return, or must borrow. He favors the policy of borrowing in such cases.

After the talk, pumpkin pie, doughnuts, and cider were served, which climaxed the evening very fittingly. Iota hopes for more such interesting and successful meetings.

ALPHA TAU OMEGA

ONE of the outstanding Fall parties in the history of our Chapter was held at the house on Saturday, November 2. Although two days after Hallowe'en, the party was in celebration of that day of mischief. The house was tastefully decorated in the colors of the season, and the refreshments were also in harmony with the holiday. Dancing and cards were enjoyed throughout the evening by one of the largest groups of Brothers to attend a party at the Chapter House.

Elaborate plans are being made for our next important social event. This will be our Christmas Formal Dance. In the past, this annual affair has been held at the Edgewood Grove Community Cabin, and it is most likely it will be at the same place this year. The Social Committee has been at work on the dance for some time, and assures the Chapter of a very successful affair.

On Saturday and Sunday, December 7 and 8, Gamma Gamma will entertain delegates to the State Conclave of Alpha Tau Omega from the chapters at Purdue, DePauw, and Indiana Universities. These conclaves are held twice each year for the purpose of discussing business and social problems of the various chapters, and planning affairs such as the state banquet and dance held annually in the Spring.

Our Chapter has always stood high scholastically, and this is especially evidenced by our present Senior Class. Two of the officers of Tau Beta Pi, honorary engineering fraternity, are Alpha Taus. Eldridge Allen is President, and Kenneth Alexander is Secretary-Treasurer. These men are R men as well, and Brother Alexander is President of the Student Athletic Board. Brother Cliff is president of the Radio Club for the coming year.

Our Mother's Club entertained the Mother's Clubs of the other fraternities of Rose, with a musical on October 15, at the chapter house. It is our hope that this party, one of a series, will do much to improve the inter-fraternity spirit at the Institute.

Several alumni of ours and other chapters have visited the house recently. Brothers Shepherd, Jakle, and Professor Wischmeyer have attended meetings, and Brothers Tom Reed, Art Drompp, and Tom Crutcher have also visited the house.

SIGMA NU

BETA UPSILON is pleased to announce the pledging on October 28, of Ernest G. Hurst of Alton, Illinois.

On October 12, Beta Upsilon inaugurated the social season with a dance at the chapter house. The urge for such an event, which the brothers had felt ever since their return to school, at last found definite form when the social committee composed of Milo Dean, Robert Roach, and Lee Kelsey, announced that finally all plans were complete for the first dance of the year. Paul Stuart's orchestra left nothing to be desired in the way of incentive for the dancers, and the brothers and their guests were unanimous in pronouncing this opening social event on the Sigma Nu calender a huge success.

Beta Upsilon wishes to express its thanks and appreciation to Lieutenant and Mrs. Richardson Selee, and Coach and Mrs. Phil Brown, who chaperoned the affair. Alumni brothers who attended were: Arthur Reinking, Valentine Mitch, and Benny Wilson.

Beta Upsilon is proud of its contribution to Rose's successful football team. Brothers who are playing as regulars and giving good accounts of themselves, are, Milo Dean, Floyd Hill, and Albert Ogan. All are assured of their letters.

A number of alumni have paid us visits in the past month, some returning for the dance, but more of them for the homecoming. They are Jack McDargh, Benny Wilson, Arthur Reinking, Valentine Mitch, Jack Derry, Galen Clark, Hugh Holmes, John Cooley, William Houston, and James White.

THETA KAPPA NU

INDIANA GAMMA is pleased to announce the pledging on October 17, of Nelson de Carvalho of Rio de Janiero, Brazil, South America.

The social committee consisting of Mick Kehoe, Don Greenfield, and Orville Potter did some very good work in putting over the Hallowe'en dance. The dance was held at the chapter house on Friday, October 25, and everyone agreed it was a "wow." The house was appropriately decorated for the occasion. Bud Cromwell's seven-piece band furnished the music as well as novelty entertainment. We had as our chaperones Dr. and Mrs. C. P. Sousley and Professor and Mrs. O. L. Stock. Invited guests were Messrs. Wells and Renfro, Theta Xi, Weddle and Roach, Sigma Nu, and Trueb and Nicholson, Alpha Tau Omega. Indiana Beta, DePauw, was also well represented, having six brothers here. Several Alumni brothers were back for the occasion.

Plans are well under way for Theta Nu's Annual Christmas Dance to be held during the latter part of December.

Indiana Gamma is glad that the Rose football team has finally hit its stride in winning games, and wishes to give due credit to Coach Brown who has worked so faithfully to put Rose back on the map in football. We are all boosting Rose for the Rose-Normal game and preparing for a big time during Thanksgiving vacation.

Several Brothers have been very fortunate in getting back to the chapter house for visits. Brothers Berry and York, class of '28, are frequent visitors at the house. Brothers Andrews, Lawyer and Knott blew in from Chicago to spend a week-end with us. Brother Wilson recently dropped around before taking up his new position in the operating and engineering department of the A. T. & T. Co. in New York City.

Brother Brown of Indiana Beta Chapter is staying at the house and attending Indiana State Normal. Several brothers from the DePauw chapter have visited the house recently.

The Mother's Club had their monthly meeting at the chapter house Thursday, October 24, with 100 per cent attendance.

KAPPA OF THETA XI

WITH the Hallowe'en season at hand Theta Xi is preparing for their annual "Bowery Dance" to be held at the home on October 26. Paul Stewart's orchestra will provide music for the occasion. This dance is always anticipated with the greatest pleasure, and according to Brother Wells, who is social chairman, no one will be disappointed this year. The house is to be decorated in bowery style, and all the brothers with their guests have been informed that they had better look "tough." On October 19th several of the brothers attended a dance at the Theta Xi house at Purdue. All those who made the trip reported a wonderful time.

The Theta Xi Mother's Club has been holding its regular meetings this year the first Friday in each month. The Mother's Club is invaluable to the chapter, and we are extremely proud of it.

Rose seems to be "up among them" this year as far as football goes. The victories over Evansville and Hanover seem to have raised the hopes, and created a spirit at Rose that has not been seen in the past few years. Keep up the good work, Brownmen!

Brothers Matson, Joslin, Schwartz, and Shaw are some of the honoraries who frequently visit the house. Also, Brother Pellum, who graduated from Rose several years ago, is living at the house. He is connected with the Big Four Railroad here.

TAU BETA PI

THE Tau Beta Pi is pleased to announce the pledging of Morris T. Shattuck, Ernest E. Johnson, Murrel E. Loffland, Milo M. Dean, Donald E. Henderson, and Howard F. Wills. Hearty congratulations are extended to the pledges for their fine work.

A dinner meeting was held at the Elks' club Wednesday evening, October 23. The meeting proved to be an enjoyable one. Thanks to Kessler and Ehrenhardt, who made arrangements for the dinner.

President Allen, who had attended the Tau Beta Pi Council held at Iowa City, gave a sketch and a few humorous incidents of the trip. He expressed his appreciations for selecting him as the representative from Beta of Indiana.

Athletics

(Continued from page 42)

touchdowns in the last of the third quarter and the first of the fourth.

The game was featured by a punting duel between Nichols of Rose and T. Felix of Earlham.

Nichols, Hill, and Dean stood out for Rose in the backfield with Kruzan playing a wonderful game on the line. For Earlham T. Felix, Johnson, and Young were the stars.

Lineup and summary:

Earlham, 20.		Rose, 0.
Kirkpatrick	L.E.	Dicks
Peacock	L.T.	Pratt
Hepworth	L.E.	Bruce
Evans	C.	Ogan
L. Felix	R.G.	Tonetti
Finch	R.T.	Haynes
Johnson	R.E.	Hylton
T. Felix	G.B.	Nichols
Bond	R.H.	Dean
Young	L.H.	Hill
Reynolds	F.B.	Heidenreich

The Rose Show

(Continued from page 31)

active committee. The official Publicity Committee will not be happy unless it works, therefore it will furnish the newspapers with some front page material and will supply speakers for the neighborhood high schools and the luncheon clubs.

Handling the crowds will require careful planning and close attention on the part of the Guides Committee. The problem will be to fill all parts of the big building equally and keep them so filled without congestion in spots, and at the same time keep the crowds moving. The main runway is admirably adapted to aid in accomplishing this.

With many worth-while exhibits demanding prominent settings, the Space Assignment Committee will be quite busy exercising fine judgment and tact in this matter.

One of the very busiest committees will be that of Placards and Signs. The show posters, important as they are, will require only a small part of the total time of this committee. Each exhibit will require a neatly printed title and number and most of them should have carefully worded explanations printed on card board. The visitors generally will greatly need and appreciate these explanations, whether they are serious or frivolous. There will be well over 500 signs to print.

Real engineering expertness will be required to supply the demands for the great flood of light and power at this great show, and to see that there is no failure of the supply. Our steam plant is quite adequate, but the engine-generator unit, though large enough for normal demands, will hardly be able to take care of half the show requirements. Even the present power company transformers, installed near the engine room, will not take care of the extra needs. These transformers will be replaced by larger ones. The Power and Light Committee will take over all special power and lighting problems and see that none of the many circuits are overloaded.

Pleasing decorations are much to be desired for our new show. Formerly we seemed to have little time to give over to this matter. It is rather characteristic of engineers to emphasize real merit and belittle ornamentation that might serve to cover weaknesses. But good decorations are truly enjoyed. Our big building will lend itself to many decorative possibilities and we should give our Decorations Committee every possible kind of aid and encouragement.

We cannot here comment on all the special organizations, such as the Camera Club, the Band and Radio Club, but they will all do their full share, and we shall be proud of them.

It is a most wholesome condition when students and faculty enthusiastically get together to do something fine for the honor and prestige of Rose. The faculty, though traditionally opposed to anything detracting from class room duties, realizes the great value to students of earnest effort in work on show exhibits and of experience in conducting the show. One hundred percent each of enthusiasm of loyalty and of application will again do great things for our students and demonstrate their quality before the general public.

Watch the show bulletin board.

R. L. Wilson

(Continued from page 37)

work in addition to his work in the Railway Department. Later he was appointed Works Manager of the East Pittsburgh Works. He filled this position admirably as he had others.

In this position, Mr. Wilson was in charge of all manufacturing operations at East Pittsburgh and of the Company relations with employes. His great ability to handle men is best shown by the fact that he continued as Works Manager during eight years without a single strike.

He thoroughly organized this department and, realizing the unfairness of the old method of wage plan, introduced into the Company wage payment by Job Classification. He also introduced the Standard Time method of evaluating wages. Each of these systems has become nationally prominent.

Mr. Wilson's next rise was his appointment as Assistant to Vice President and General Manager, and, in June, 1929, was appointed Assistant to President.

Mr. Wilson never allows himself to be burdened with unimportant details. Always on the job; deliberation is his motto. He is never known to hurry but his average speed is high, because his wheels are so well fitted and lubricated that friction, vibration and lost motion are practically eliminated and, like the Yankee soldiers, he moves in only one direction—forward. His quiet, unobstrusive manner and his absolute fairness are the big factors in securing that co-operation which is the greatest essential in manufacturing. He has the respect and confidence of every one, and is one of the few who have been honored by the Veteran Employes Association by selection to the Board of Directors, Trustee and President. He is, also, very active in other shop organizations, applying the reliable methods that are so characteristic of him.

Mr. Wilson talks little; his achievements bear testimony of his greatness. The difficulties through which he sailed victoriously, always composed and calm, only fitted him for bigger achievements and accomplishments and have earned for him the position of Assistant to President of the Westinghouse Electric and Manufacturing Company.

He is a fellow of the American Institute of Electrical Engineers, and a member of the Engineering Society of Western Pennsylvania, the Engineers' Club of Pittsburgh, and the Edgewood Country Club.

Camera Club

THE Camera Club has started the year with a large membership and much enthusiasm which presages a good year for the club, and we expect a great deal from it.

At the last meeting officers for the year were elected as follows: Andrew Davy, of Terre Haute, president; Robert Mees, of Columbus, Ohio, vice president, and Frederick Bogardus, Terre Haute, secretary-treasurer. Professor Peddle is faculty advisor.

Research and Progress

(Continued from page 39)

the material mined is recovered as ore, the rest being clay, free moisture, and fine bauxite. After this process, it is carried on a belt conveyor to the drying kilns. These kilns are 8x120 feet, with a capacity of twenty-eight tons of dried ore an hour. They are fired with pulverized coal. About 98½ per cent of the moisture is removed in these kilns. From here the material is discharged and taken away to storage for cooling. When sufficiently cooled it is again carried to dumps to be later loaded on ship board by means of loaders which can load approximately 525 tons an hour.

Close control is kept on the entire operation by taking frequent samples of the ore at different stages in treatment. The ore body is explored by various spaced drill holes. The preliminary exploration holes being spaced about two hundred feet apart. Samples are collected from each hole drilled. Each day the average analysis of the ore fed to the mill is compiled. By taking samples from the washed ore and from the ship loading conveyors, an exact analysis of every shipload is kept.

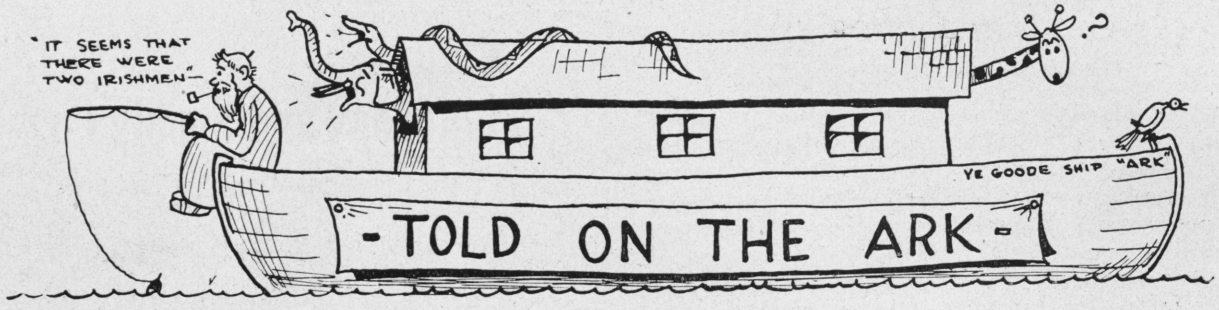
The power used in the process is developed by three complete units, each consisting of a five cylinder 500 h. p. 4 cycle Diesel engine coupled to a 500 k. w. a. generator. The Diesel engines each make 200 r. p. m. and each are of the air injection type. For lighting purposes a similar but smaller group of engines are used.—*Abstract Mining Engineer.*

Campus Notes

(Continued from page 44)

Aircraft," he pointed out the need for equipment and methods that will reduce the weather hazards of air transportation.

The Indianapolis section was the guest of Purdue University for the meeting, Saturday, October 19. The program included the Purdue-DePauw football game at the Ross-Ade stadium at Lafayette and a 5:30 dinner meeting in the Fowler hotel. The topic of the meeting was "Engineering Problems in Aviation." R. B. Moore, dean of the School of Science, spoke on "Lighter Than Air Machines," and Capt. S. W. Hoskins chose "Heavier Than Air Machines" for his subject.



He: "C'mon outside—I want to show you some new steps."
She: "Maybe we'd better sit in the car, it's pretty cold on the steps."

Bride: "There are a lot of mistakes in this cook book."
Husband: "Yes, I've tasted them."

He's so dumb that he thinks Oxford bags are co-eds.

Dumb: "Why can't we get married? You know I'm head over heels in love with you."
Belle: "Sure. I'm just waiting till you get on your feet."

Of all the words of tongue or pen,
The saddest are—
"I'm broke again."

"This is the most successful debating club in this city," said the cop as he waved his night stick.

"What do you like most about my girl?"
"Both my arms."

Speaker: "Gentlemen, I ask you again, did you ever stop to think?"
Weary Listener: "Did you ever think to stop."

Cop: "Where are you going?"
Stewed: "Don't tell me, let me guess."

She: "Does Champagne make you see double?"
He: "No, but it makes me feel single."

Ed: "I'm groping for the right word to use."
Lois: "Well, you won't find it around my waist."

I'm getting tired
Of Loretta Shields,
She's satisfied more guys
Than Chesterfields.

Beautiful Girl: "No, Sam, I cannot be your wife. Please go away and forget me."
Rejected Lover: "No use; I'm a memory expert."

"But Jack seems to get a great deal of pleasure out of his math class."
"Yeah; out of it."

She: "What did you stop here for?"
He: "Well, if you don't know I guess we'd better be moving along."

"I'm glad the world is filled with sunshine."
"An optimist?"
"No, an awning manufacturer."

Motorist: "Is it very far to the next town?"
Native: "Well, it seems further'n it is, but it ain't."

Hardhearted Grocer: "No sir, no checks. I wouldn't cash a check for my own brother."
Customer: "Well, of course, you know your own family better than I do."

He: "Yes, I'm married now."
She: "What's your wife like?"
He: "Oh, Scotch, rye, gin—almost anything."

"I wonder why they say 'Amen' and not 'Awomen'?"
"Because they sing hymns and not hers."

Barber: "Any particular way you'd like your hair cut?"
Customer: "Yes, off."

Goil: "Do you think that a girl should learn to love before twenty?"
Boiy: "Nope, too large an audience."

A popular man is Shorty Spence,
He keeps his women in suspence.

Teacher: "What is Boston noted for?"
Johnny: "Boots and shoes."
"Correct. And Chicago?"
"Shoots and Booze."

"I went out with a professional mind-reader last night."
"How did she enjoy her holiday?"

"I would like a raise in salary for two reasons."
"Those are?"
"Twins."

Jack: "You'd better keep your eyes open around here."
Mack: "Why,"
Jack: "People will think you're a darn fool if you go around with them shut."

Synthetics

(Continued from page 34)

Then the development of the synthetic product by the Germans brought the price down to about 40 cents. This has forced the Japanese to cut prices in order to retain even a part of their former market.

Again the world has benefited by the conflict between the synthetic and the natural product. Camphor is used in the making of celluloid, for which about 6,000,000 pounds are used every year. The low cost of camphor has enabled the celluloid industry to expand to its present proportions. In addition, the menace of a monopolistic control has been relieved, and a more economic exploitation of a natural resource has been forced.

The story of synthetics is an amazing and inspiring tale. No longer need the world fear a monopoly of some natural industry. No longer need it fear a food or a fuel famine. The development of synthetics has long since passed the novelty stage, and some day our whole life may be regulated by synthetic products.

However, there is one thing that is needed, and that is even now coming to pass. Chemistry and industry need a closer co-operation. Scientists may devise ways of turning waste piles into useful articles; but the piles will keep on growing, unless there is a market for them at a price which will yield a profit. The utmost co-operation between chemistry and industry is the ideal condition. By the aid of it the way will be opened to greater comfort, better life, and broader well-being.

Air Washing and Conditioning

(Continued from page 35)

be equally comfortable. Thus, for a given air condition (dry-bulb, wet-bulb and velocity) the difference in effective temperatures with and without clothing is a measure of heating or cooling effect produced by the clothes.

Carrier Air Washers and Humidifiers are coming into use more and more every day. There is manifest an increasing demand for the greater luxury and comfort of controlled temperature and humidity. In summer such control within the comfort zone can only be obtained by the use of dehumidifiers, to cool the air below the dew point.

The modern theater is an example of what can be done by the proper application of dehumidified air. In hot humid weather the cooled theater is a haven of rest and comfort, constantly flooded with air at just the right temperature and humidity, automatically controlled regardless of outdoor weather conditions.

Wherever people assemble, whether for work, entertainment or play, dehumidified air is being increasingly used. In clubs and assembly halls, in offices, department stores, churches, restaurants, dance halls, shops, controlled air conditions are contributing much to comfort and headth and creating a feeling of good will on the part of the public.

Mapping Projects by Government Agencies

(Continued from page 32)

80 by 400 miles. At the present time there are about 50 of these strip maps in use and they cover practically all of the main air ways of the country.

In recent years most of the topographic mapping executed by the Corps of Engineers, U. S. Army, has been in the foreign possessions of the United States, Panama, Hawaii, and in the Philippines. Within the territorial limits of the country such mapping that has been done has been confined to the Southwest Border and to Military Reservations. The Air Corps and the Corps of Engineers are responsible for extensive development of aerial mapping methods and equipment and are co-operating with other government agencies in the production of aerial maps. The Chief of Engineers has exclusive jurisdiction over questions relating to river and harbor improvements of the country, subject to the orders of the Secretary of War. Consequently all surveys dealing with navigable waters are executed under the direction of officers of the Corps of Engineers.

The idea of a world map originated in the mind of a Professor Penck of Germany in 1891 but not until 1909 was he able to get his plan before a representation empowered to do anything about it. His plan was adopted by most of the nations of the world and each country agreed to map its own area. The scale chosen was 1:1,000,000 and the sheets were to include 5 degrees by 6 degrees, necessitating some 2,000 sheets for the entire world. The scale therefore is about 16 miles to the inch and sheets were to include contours, roads, railroads, wireless stations, landing fields, boundaries, etc. The Federal Board of Surveys and Maps approved this project for the United States and recommended $5,000,000 for its execution. No money has been appropriated and consequently out of the 40 sheets that would cover the country, 4 have been completed. Most of Europe, Asia, South America, and even Africa have the greater portion of this world map completed.

Commercial requirements, strategic needs, training needs of our defensive forces, investigations of our navigable waters, flood control and conservation projects all demand more topographic maps of the country. England is covered by a 6-inch-to-the-mile map and is nearly covered by a 21-inch-to-the-mile map and the same is true for much of Europe while more than half of this country hasn't a topographic map of any scale.

"Gee, how scared you look."
"I'm not scared. I just washed my hair."

Teacher: "Willie, I want you to use the word Java in a sentence."

Willie: "Java good time with your boy friend last night."

How Great Is Your Mathematical Power?

(Continued from page 36)

Then: $x=5a+1$, $a=\frac{x-1}{5}$, $a+1=\frac{x+4}{5}$

also, $x-(a+1)=5b+1$, $b=\frac{4x-9}{25}$, $b+1=\frac{4(x+4)}{25}$

also, $x-(a+1)-(b+1)=5c+1$, $c=\frac{16x-61}{125}$

$c+1=\frac{16(x+4)}{125}$

also, $x-(a+1)-(b+1)-(c+1)=5d+1$, $d=\frac{64x-369}{625}$

$d+1=\frac{64(x+4)}{625}$

also, $x-(a+1)-(b+1)-(c+1)-(d+1)=5e+1$,

$e=\frac{256x-2101}{3125}$, $e+1=\frac{256(x+4)}{3125}$

But, $y=x-(a+1)-(b+1)-(c+1)-(d+1)-(e+1)$

Substituting the above values and collecting terms

$$y=\frac{1024x-8404}{3125}$$

Let $y=20n$, for y is exactly divisible by 5 and 4, and therefore is divisible by 20.

The problem resolves itself into the question: what is the smallest multiple of 20 that will make x an integer.

If $n=0$, $x=8\frac{53}{256}$; and if $n=1$, $x=69\frac{62}{256}$

and we see that a difference of $61\frac{9}{256}$ - -

in x produces a difference of 20 in y. Then x will be an integer if $9n+53=256m$, which is satisfied by

$m=2$, $n=51$

or $m=11$, $n=307$, etc.

Therefore, $y=\frac{1024x-8404}{3125}=1020$, or 6140, etc.

and $x=3121$, or 18,746, etc.

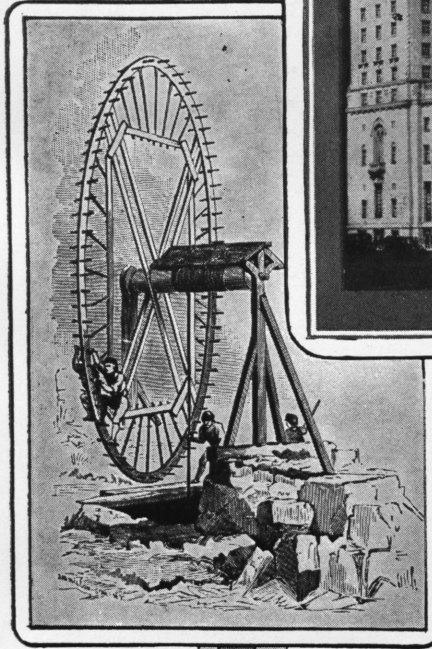
Alumni

(Continued from page 43)

Rose Poly, there were many alumni in town for the football game between Rose and Hanover, and the homecoming dance. The following were among the alumni present on that date: H. W. Foltz, '86; Paul Turk, ex-'06; W. B. Shook, '11; P. A. Newhart, '11; W. H. Brewer, '13; G. J. Stoner, '15; L. D. Gwinn, '15; R. S. Davis, '17; K. A. Froeb, '20; John Jakle, ex-'23; H. J. McDargh, Jr., '23; C. P. Watson, '24; Nelson Shepard, ex-'26; T. B. Crutcher, '27; R. F. Alexander, '28; Lee Berry, '28; W. L. King, '28; G. J. Mason, '28; A. J. Nehf, '28; Henry Nancrede, '28; T. M. Reed, '28; T. S. Bell, '28; J. C. Cooley, '29; Wayne Dodson, '29; Galen Clark, ex-'29; Richard Markle, '29.

THE ROYAL YORK HOTEL, TORONTO, CANADA

Ross & MacDonald, Architects *Sproat & Rolph, Associate Architects*



Reproduction of an old wood-cut showing one of the early phases of Vertical Transportation

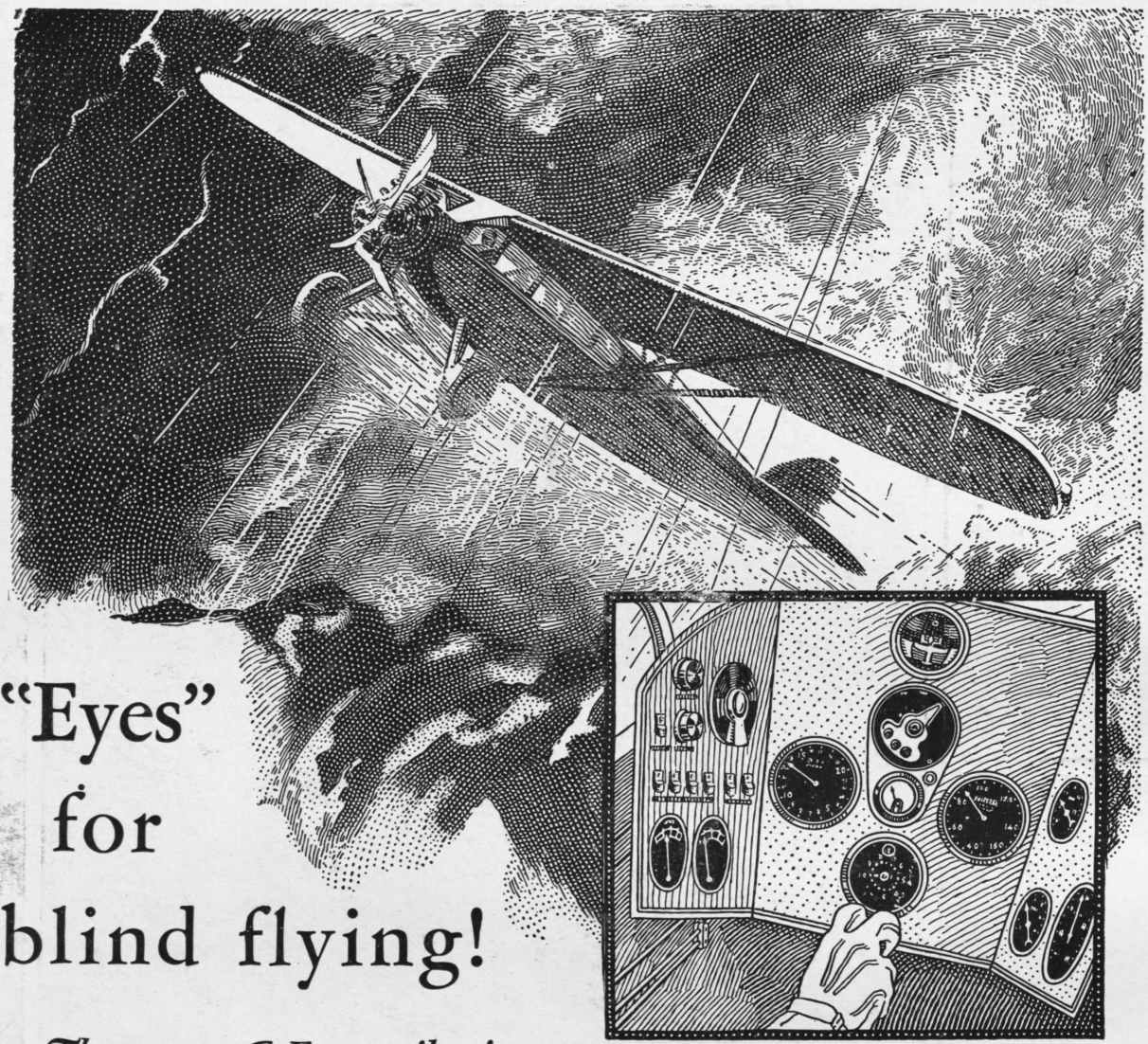
The Tallest Building in the British Empire

THE new Royal York Hotel, Toronto, Canada, is the British Empire's tallest building and its largest hotel. This immense structure embodies modern improvements throughout and particularly in regard to Vertical Transportation, which is provided by seventeen elevators of Otis-Fensom manufacture. Ten of these are Otis Signal Control elevators, and the remainder are equipped with Otis "Flying Stop" control.

Here again is found proof of the saying that "most of the world's famous buildings are Otis-equipped."

OTIS ELEVATOR COMPANY

OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD



"Eyes" for blind flying!

Three new G-E contributions to the conquest of the air

LINDBERGH, flying blind much of the way, hit Ireland "on the nose" as he winged toward Paris. Now, as an aid to air navigation comes the magneto compass, a product of General Electric research, which gives pilots a navigating instrument of extraordinary accuracy.

Meanwhile, two other General Electric contributions to aviation have been developed—the electric gasoline gauge and the radio echo altimeter. The ordinary altimeter shows only height above sea level. The radio echo altimeter warns the pilot of his actual distance above ground or water by flashing green, yellow, and red lights on the instrument board.

Every year hundreds of college-trained men and women enter the employment of General Electric. Research, similar to that which developed "eyes" for blind flying, is one of the many fields of endeavor in which they play an important part.

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