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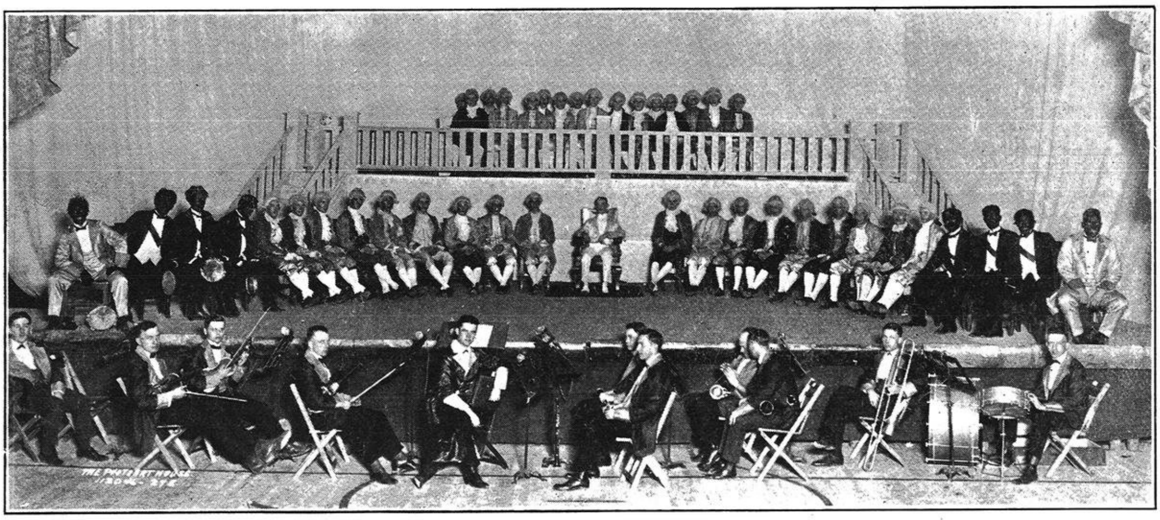
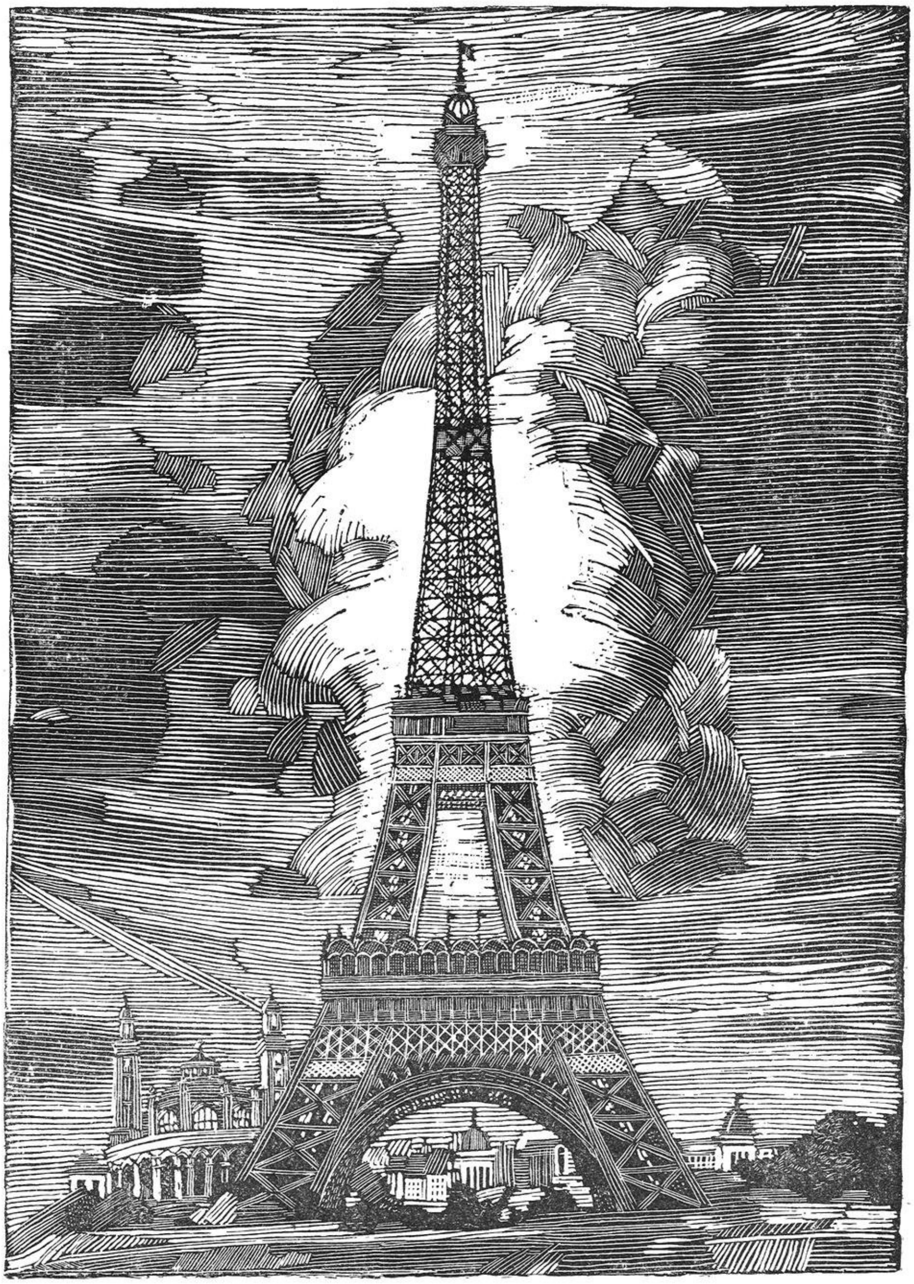


THE ENGINEERS' MINSTRELS



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VOL. XXV, No. 3. MADISON, WIS. DECEMBER, 1920.

A BRIEF HISTORY OF THE DEVELOPMENT OF CONCRETE BOATS

By Solomon C. Hollister, c '16

Member of the Firm of Wig, Hollister & Ferguson, Philadelphia.

The first concrete boat on record was a rowboat built in 1849, at Carces, France, by M. Lambot. It is interesting to note that this boat not only marks the starting of the history of concrete ship construction but it was also the first example of what, today, would be called reinforced concrete. This boat of M. Lambot's was patented and exhibited at the World's Fair in Paris, in 1855. It is said to be still in service.

S. C. Hollister

It was not until thirty-eight years later, in 1887, that any further attempts were made to construct concrete boats. A small boat was then built, in Holland, by the Fabriek van Cement-Ijzer Werken. It was called the "Zeeneuve," or "Seagull," and was at first used for duck shooters. It was still in use in 1918 by a cement products company in Amsterdam. The Fabriek van Cement-Ijzer Werken first built barges up to eleven tons capacity. These proved so successful that the plans were elaborated and resulted in the building of barges sixty-four feet long, fourteen feet beam, and of fifty-five tons capacity. The system of construction consisted briefly, of building longitudinal and transverse bulkheads spaced, approximately, six feet apart, thus providing a cellular construction which made the craft practically unsinkable.

A motor-boat, built for pleasure purposes by R. Last & Sons, Holland, is also of interest. This boat was built by covering a framework of steel ribs and longitudinal rods to which wire mesh was attached, with a coat of mortar, making the finished shell about one-half inch thick.

In 1897, Carlo Gabellini, of Rome, Italy, began the construction of concrete scows, barges, row-boats, and bridge pontoons. One of his barges, which was built in 1906 for the military harbor at Spezzia for the use of the Italian Navy, was subjected to the very severe test of being driven against some piling and subsequently rammed by a steel towboat, and yet showed results so satisfactory that the construction of similar barges followed.

The Gabellini method of construction differed greatly from the methods which up to that time had been used elsewhere. Reinforcement of the keel and ribs, usually consisting of round steel rods, was first placed. This reinforcement was then covered on the outside with one-fourth inch wire mesh to which a one inch coat of cement mortar was applied by hand. A somewhat thinner coat of mortar was then placed inside, following which, forms for the ribs and keel were put in place and concrete deposited for these parts of the vessel. These ribs ran both longitudinally and transversely, a checkerboard arrangement resulting, the pockets being ten inches deep. A one-eighth inch wire mesh was then placed over these ribs and a thin mortar covering plastered on. Finally a third and coarser wire mesh was pressed into the soft mortar and the entire surface was troweled over. This completed the hull. Bulkheads were next concreted, and the boat was finished with a wooden sheer strake and gunwale.

Pontoons made from ferro-concrete in 1900 have cost nothing so far for maintenance, yet have withstood shocks from both ships and ice. Wooden pontoons similarly used on the River Po have to be renewed after five years, and, after nine or ten years, it is no longer worth while to caulk them.

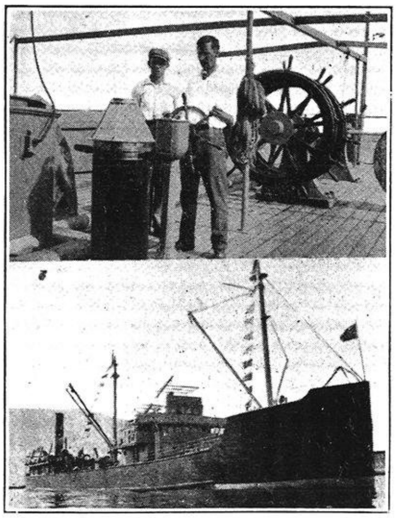
In 1909, following the precedent established by the Dutch, German shipbuilders constructed a two hundred and twenty ton concrete freighter at Frankfort-on-the-Main. Simple forms were set up and concrete placed between them, the result being a boat. The main hull had parallel sides but elsewhere the lines were fairly good. In 1912, in Dresden, a concrete sail-boat was built embodying the latest principles of sailing construction.

Since 1912, England has constructed a large number of concrete barges for use on canals. In 1917, one hundred and forty concrete barges, 1,400 tons each, and twenty-four tug boats of various sizes were being built.

The Sydney Harbor Trust Company, Sydney, New South Wales, constructed a pontoon one hundred and ten feet long, from fifty-three to fifty-seven feet wide, with a draft of seven feet to nine inches, and a total displacement of seven hundred and eighty-three tons. This pontoon has withstood the severe treatment it has received from the ferries using it as a landing stage.

About 1914, the Fougners Stall-Beton Skibsbygnings Compani, Christiania, Norway, began construction at their yard at Moss, Norway, of a number of small pontoons and barges. In 1917 they constructed a boat of about 200 tons capacity with sufficient sea-worthiness to run to the English Coast. This boat is probably the first sea-going concrete craft, although it is, of course, not of sufficient size to withstand general ocean service. The Foungner Company have successfully built a number of small yachts and lighters and have constructed a floating drydock of concrete of sufficient capacity to handle any of the boats which they have thus far constructed.

The first concrete boats built in the United States were a five hundred and twenty-five ton concrete scow, built for the San Francisco harbor traffic, and some barges built for use at Balboa, Panama Canal, in 1910. On June 14, 1914, a concrete barge built at Mobile, Ala., was launched. This barge was ninety feet long, twenty-six feet wide, and nine feet deep. The work of construction was done by Luigi Valpi, an Italian, and the Gabellini system of construction was used. The barge was swept ashore, in 1916, in a heavy storm where it settled on the end of a pile which punctured the bottom. It has recently been repaired and is again in service. Several other concrete boats and pontoons have been constructed by private concerns in the United States since 1910, notably several 500-ton barges built in Baltimore, in 1914, by Mr. O. Lackey.



JOE SCHWADA AND THE CONCRETE SHIP "FAITH".

In 1917, at Redwood City, California, the San Francisco Shipbuilding Company undertook the construction of an ocean-going cargo vessel of nearly five thousand tons, three hundred and thirty feet long, and forty-six feet beam. This boat, christened the 'Faith', was launched March 14, 1918, and made her trial trip May 5th in San Francisco bay. The trial trip was entirely successful. The "Faith" has since traveled over thirty-five thousand miles. Her first trip was to Seattle and back. She then went to Peru with lumber, then to Iquiqui, Chili, for a cargo of nitrate, to New Orleans, via the Panama Canal, thence to a north port in Cuba for a cargo of sugar for New York. She arrived in New York in November, 1918, and while in the harbor was inspected by a party of officials from the Emergency Fleet Corporation, who found her in good condition and declared her a success, after twelve thousand miles of sailing. She is at present in service in South American trade.

At the present time, concrete ship construction is being carried on in considerable volume in England and France. The number of yards for the construction of reinforced concrete ships and barges in the British Isles is increasing. Some two hundred and twenty vessels are in the course of construction. Several vessels of one thousand tons dead weight capacity are about completed. Steam tugs of seven hundred and fifty horse power, in addition to six cargo steamships of eleven hundred and fifty tons dead weight, are being built for private ownership, and designs have been prepared for steamers of much larger size. This represents a total of about two hundred thousand tons of shipping, and a total outlay estimated at nearly four million pounds sterling, apart from the cost of land and shipyard plants. The French Government constructed, during the war, a large number of concrete tugs for river and canal service. These boats were about ninety feet long and had a shell thickness of two and one-half inches or less. Concrete ship construction has not, however, reached the volume that it has in England where a number of patented systems have been developed, including some interesting methods of unit construction.

During the war the Emergency Fleet Corporation had under contract the construction of 42 concrete vessels ranging from 3,000 to 7,500 tons capacity each. The general reduction in the shipping program at the time of the Armistice cut this figure to 12 ships. During this same period the Division of Inland Waterways constructed 21 concrete canal barges of 500 tons each for service on the New York State Barge Canal. These barges were designed and constructed under the immediate direction of the Emergency Fleet Corporation.

The Navy Department constructed several 500-ton lighters for experimental purposes. The Transportation Service of the United States Army constructed 10 reinforced concrete floats of 34 ft. beam and a length of 265 ft. It constructed, in addition, a number of 100-ton water-boats. Within the last six months the Transportation Service has let contracts for another fleet of these 100-ton boats.

The history of the service given by concrete craft is varied. After reducing the available information to a reliable basis, it appears that, in general, the concrete barge or ship is a success from the standpoint of design and construction. From the standpoint of operation, some difficulty has been experienced with barges operating in restricted channels unless these barges are properly fendered. The sides of a concrete vessel are apparently more tender than the sides of a steel ship and require, therefore, greater care in handling where obstacles are likely to be encountered, and, where possible, a greater amount of fendering than is usually applied to a smaller steel vessel. This tenderness is not so important in the case of a ship as it is in the case of inland water craft. Whether a ship is of steel or concrete, makes relatively little difference when one takes into account the impact of so large a moving mass.

It is important here to mention the recent unfortunate experience of several of the government concrete vessels. In February, 1920, a 3,500-ton vessel ran on the rocks off the Maine Coast. Early in the summer, two 7,500-ton tankers ran onto a breakwater at Tampico, Mexico. In the last week in October, a 3,500-ton vessel, in collision with a steel vessel, was sunk in Narragansett Bay with a loss of 19 lives. Investigation shows that in every case faulty navigation was the cause of the mishap. In the first instance the ship was over a mile off its course and ran onto the submerged rock edge with a speed of eleven knots. Nine men who put to sea in a life-boat against the captain's orders were lost in the storm. The remaining number of the crew, however, were taken off the next day by the Coast Guards. Although nearly the entire length of the bottom of this boat was very severely damaged, it is reported that at the present time it is being salvaged for repairs. The two tankers which through poor piloting struck breakwaters at Tampico, have been repaired and one has been returned to service. The best available reports concerning the last accident indicate that the concrete ship suddenly changed its course when about to pass a steel vessel loaded with iron ore and was struck nearly midships by the bow of the steel vessel.

It seems reasonable to believe that any of these mishaps befalling a steel vessel would have resulted in like disaster.

Reports have been received that China contemplates the construction of five hundred thousand tons of concrete ships and barges for inland water traffic. The first concrete ship built in China, the "Concreate," was taken for a trial trip August 22, 1918, on the Whangpoo River. The boat was equipped with two four-cylinder, four-cycle motors of thirty horsepower each, and made a speed of eight knots, going through the water with a total absence of vibration. Her trial trip was entirely satisfactory.

Japan also is interested in the building of concrete boats. The Japanese Government has supervised the construction of a boat at Fukuyama, near Tokio. Silico-concrete was used in the construction and, if the experiment is successful, a number of six hundred ton vessels for Japanese coast trade will be built of the concrete mixture. The silico-concrete boat is said to be forty per cent lighter than she could have been under ordinary concrete construction and twenty-five per cent lighter than if steel had been used.

ENGLISH GOVERNMENT AID TO HOUSING
A PROGRAM FOR 80,000 HOUSES

By Leonard S. Smith
Professor of City Planning and Highway Engineering

In the preceding October and November numbers of the Engineer the writer has reported the conclusions of the World Housing Congress held in London last June and the great popular interest taken by all European peoples, high and low, in the question of furnishing decent homes for the workmen. Foreign governments fully realize that it is not through increase in wages alone, but rather through increase in home comfort and home happiness that stability of political and social conditions can be insured, and modern society saved from the vagaries of sovietism. European governments have in fact for several years considered the building of homes for workingmen as a public utility—similar in nature and quite as fundamental to society as the furnishing of a water or sewer system. Accordingly both national and municipal governments have used public funds to house and sometimes re-house the workingmen—the backbone of every nation. The present subsidies are only of a more generous nature and on a larger scale than those common before the war.

Present Housing Conditions

The effect of the war in England has been:

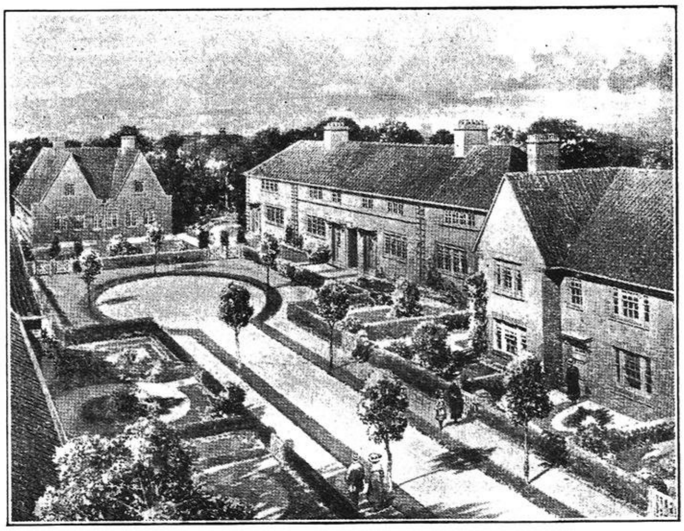
(1) To increase abnormally the shortage of houses.

(2) To suspend practically all work of closing and repairing unfit houses and the clearing of slums.

(3) To increase the cost of labor and building materials to about four times pre-war prices.

(4) To increase the interest on capital; and

(5) To produce an acute shortage of building materials.



Some of 5,000 Workingmen's Houses at Bristol, England.

Even in the years preceding the war there had accumulated a distressing housing shortage all over Great Brittin. But the war, by adding enormously to city growth

*This is the third and last of a series of three articles by Professor Smith on the London Housing and Town Planning Congress. The other two have been published in the October and November issues of the Engineer. The present article has appeared in the Nov. 24 issue of Engineering and Contracting.

and by the practical stopping of house construction, created a house famine truly alarming. A royal commission appointed in 1919 reported that the housing shortage was an important cause of the labor and social unrest. This shortage in England and Wales alone amounted to quite 500,000 houses. It was early realized that the private builder could not be relied upon to make good this deficiency, especially in view of the certainty that the high cost of labor and building materials, current during and at the close of the war, could not last permanently, and, in fact, that a shrinkage of 25 per cent or more was an assured thing.

Government Subsidies

Under such circumstances the English government has shouldered the load and responsibility of assisting the building of homes, regarding such expenditures as an inevitable consequence of the war similar to the paying of bounties and pensions to its soldiers. As early as July, 1917, the war cabinet decided that substantial financial assistance would be given "to those local authorities who are prepared to carry through without delay, at the conclusion of the war, a program for the housing of the working class." It was appreciated that these classes would be unable to pay an economic rent based on the abnormal cost of houses and accordingly the state offered to bear three-quarters of any loss in rent for a period of not less than seven years, and also a similar proportion of any loss in the inventoried value of the houses at the expiration of such 7 year period. The local government was to bear the remaining one-quarter except in case this should add more than "1 penny in the pound to the resulting taxes (about 0.4 of one percent i. e. 4 mills). At the same time the state offered to loan government funds for house building at the current rates of interest. Of course all offers of State aid were for limited periods only and under regulations of control of size and architectural features.

The British Institute of Architects instituted competitions for different styles of houses suitable for the various districts, having in mind local requirements and local supply of building materials. It is also interesting to note that in these plans of new cottages, regard must be had to the convenience and comfort of the housewife, especially in the interior arrangements, and that the best way to secure this was to consult with the housewives themselves. A Woman's Committee was accordingly appointed by the Ministry of Reconstruction and rendered important services.

Public Utility Companies

The crown authorities early realized "that the complete solution of the housing problem is not likely to be accomplished except with the co-operation of private enterprise including public utility societies." The latter is defined as a society (with limited liability) registered under the Industrial Act of 1893 for carrying on any industry, business or trades specified in or authorized by its rules. The law provided also that: (1) The society must provide for an audit and publication of its accounts, (2) must limit interest and dividends to 6 per cent per annum, and (3) the provision of working class houses must be specified as one of its objects.

There is no statutory definition of "the working classes" which is applicable to housing, but the government circulars state that this term "should be generously interpreted."

Sources of Help

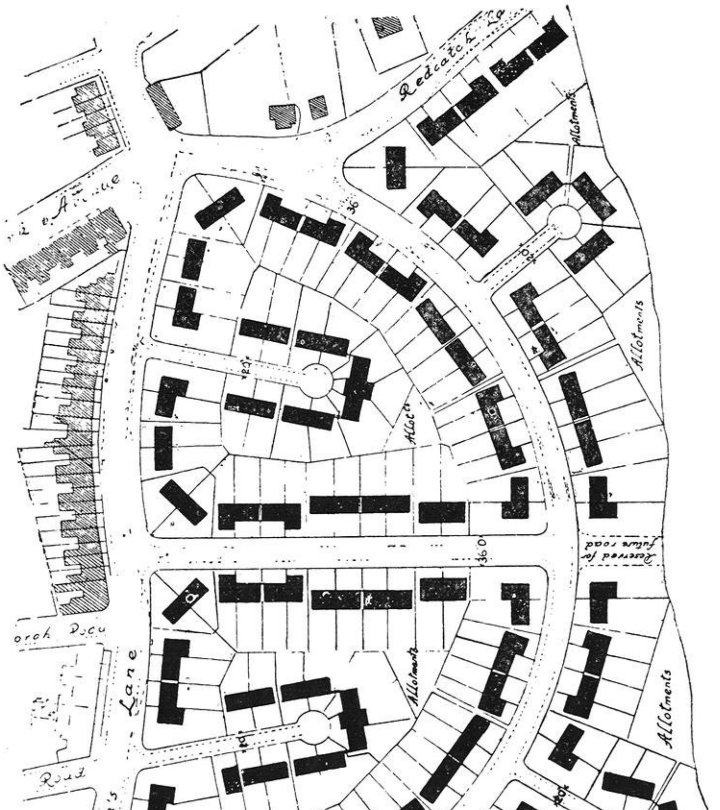
A public utility society can obtain assistance from two sources, viz., the federal government and by the local authority of its area, county, town or district council.

The government can help in two ways:

(1) By loans of money.

(2) By cash subsidies.

Recent laws provide that the state loan commissioners have power to loan sums not exceeding three-quarters of the purchase price of the land together with the cost of its development and the buildings erected thereon provided the department is satisfied with the security. The terms of the mortgage given for the loan provide for the repayment in a period not exceeding 50 years at 6% interest. The payments are payable half yearly, either by equal payment of principal with interest on principal for the time being outstanding, or by equal half yearly payments of principal and interest combined by way of an annuity. This half yearly annuity, to repay a loan in 50 years with interest at 6% per



LAYOUT OF GROUND FOR WORKINGMEN'S HOMES, BRISTOL, ENGLAND.

annum, is £3—3s—4d per £100 borrowed. This annual amount, £6—6s—8d, will be referred to later as the loan charge per £100.

Subsidies

In addition to thus making loans to Public Utility Societies the State will also grant them an annual subsidy, calculated as a proportion of the total loan charges on the whole of the capital raised by the Society whether obtained from the state or private sources.

The law provides that until 1927 this proportion will be 50 per cent and from 1927 until the government loan has been repaid the proportion of the loan charges subsidized by the state shall be 30 per cent. Also if no loan is obtained from the state the subsidy will be paid for a period of 50 years. Again the proportion of the loan charge payable by the state is not affected by the rate of interest paid to private parties even if this rate is very much less than 6%. The purpose of this is to encourage the utility societies to borrow from banks and individuals.

Illustration

The following illustration of the work of this law is taken from a circular issued by the British Ministry of Health under date of Jan., 1920.

Suppose a Society decides on building 50 houses to cost £800 each including land, roads, etc., or a total of £40,000. The loan charges on this capital would be 400 x £6—6s—8d or £2544—6s—8d. The annual subsidy up to March, 1927, would be 50 per cent of £2533—6s—8d or £1266—13s—4d and for the remainder of 50 years would be 30 per cent of £2533—6s—8d or £760.

Of the total capital £40,000 the state would loan three-quarters or £30,000 leaving the society to obtain £10,000 from other sources which we will assume is obtained at 3 per cent.

The following would be a specimen balance sheet for the period ending March 31, 1927:

Loan charge on State loan, 300 x £6—6s—8d	£1900—
Government subsidy	£1266—13—4
	£ S d
	633— 6—8
Interest at 3% on £10,000	300— 0—0
Repairs at £4 per house	200— 0—0
Management, taxes, vacancies	160— 0—0
	1293— 6—8
Rent at 10 shillings per week exclusive of taxes	1300
Balance	6—13—4

It will be noted that the rent of 10 shillings ($2.50) per week is very much less than the economic rent. Where the British government rent restrictions are removed the rent of houses in general will tend to rise until the new "economic" level has been reached. The rent restriction laws do not apply to the new houses, but naturally the rents obtainable for such houses will depend in some measure on the rents obtainable for similar existing houses.

An important reason for the state aid is the imperative need of houses, and properly enough the state's offer is limited to such projects as can show reasonable progress before August 1, 1920. It is expected that the housing projects will be completed before July 31, 1922.

Sale of Houses

Government subsidized houses may be sold by the consent of the government Loan Commissioners but only at the market price which must not be less than the following prescribed minimum prices based upon the approved value, or the outstanding amount of the loan raised to defray the capital cost of building and improvements.

Minimum Prices of Subsidized Houses

If the sale is completed	the minimum sale price will be
Before April 1, 1921	63 per cent of approved value
Before April 1, 1922	64 per cent of approved value
Before April 1, 1923	65 per cent of approved value
Before April 1, 1924	66 per cent of approved value
Before April 1, 1925	67 per cent of approved value
Before April 1, 1926	68 per cent of approved value
Before April 1, 1927	69 per cent of approved value
After March 21, 1927	70 per cent of approved value

The variation of the percentages during the years 1921-1927 is due to the fact that the annual subsidy for these years, viz., 50%, is capitalized at the date of sale and applied in reduction of the outstanding loans. Thus the prescribed minimum sale price is the amount of the outstanding loan less the capitalized value of the subsidy at date of sale. A sale at the minimum sale price thus gives the purchaser the full benefit of the subsidy and at the same time extinguishes all loans.

The houses may be sold for more than the above minimum prices, and if so, the excess is due to the Society which takes the initial risks in building the houses. Houses can be sold only to the occupiers and such purchasers must agree with the Society that in the event of his ceasing to occupy the house, or in the event of his death, the Society shall have the right to buy back the house at its original cost, less the depreciation. This clause is devised to prevent speculation in subsidized houses. In general it is expected to sell subsidized houses rather than to rent them.

Additional Subsidy

Under a law passed Dec. 1919 the following subsidies were offered to private persons or groups of persons constructing houses under certain specifications, provided such houses were completed before December 23, 1920.

(a) Houses containing two living rooms (i. e. living room and parlor), and three or four bed rooms and comprising not less than 920 square feet of floor area £260 per house.

(b) For houses containing one living room and three bed rooms, and comprising not less than 780 square feet of floor area £240 per house.

(c) For houses containing one living room and two bed rooms and comprising not less than 700 square feet of floor area £230 per house.

(d) Houses begun before April 1 shall be entitled to a subsidy of £50 additional above that given in paragraphs (a), (b), (c).

(e) No grant shall be given to houses of more than 4 bedrooms or exceeding 1400 square feet of floor area.

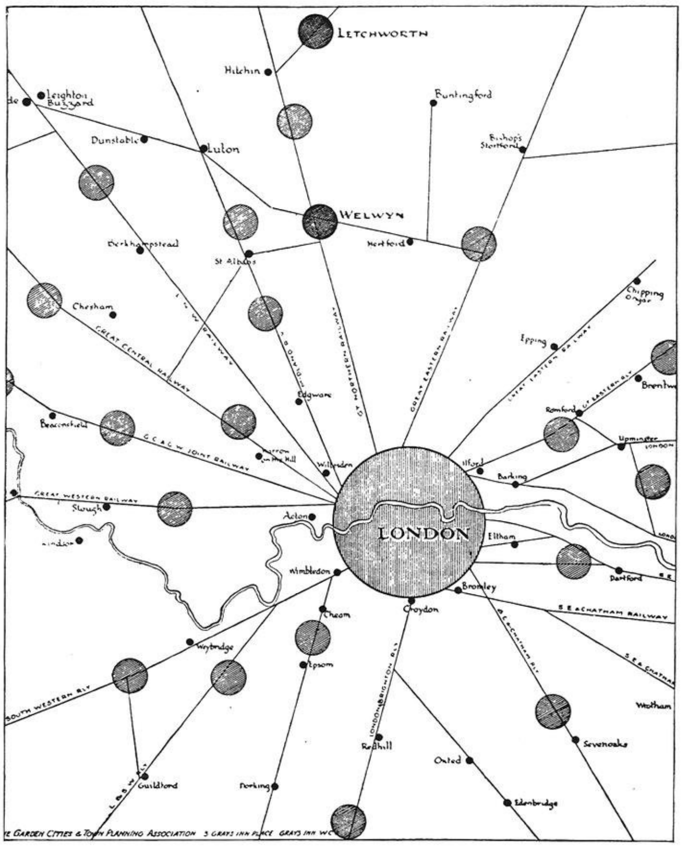
A question of much interest to those who have read the foregoing explanation of English laws designed to solve the national housing problem,—is "how have these laws worked out," and is there ground for the hope that they will accomplish their object.

The English Ministry of Health published under date of May 24, 1920 the following facts.*

1. In the two weeks ending May 15, 1920, local authorities and public Utility Societies had submitted 158 housing schemes, including 4073 acres providing for 5812 houses and that contracts had been let for 3652 of these houses.

2. That the total applications for subsidies up to May 15 numbered 10,016 comprising an area of 65,710 acres and providing for the erection of 197,232 houses of which 102,301 houses were under contract.

After personally inspecting some thousands of these houses and noting the general interest taken by the public in the purchase of local housing bonds, the writer is convinced that the housing problem in England is in safe hands and bids fair to be solved in a reasonable time if present progress can furnish a criterion. This brief resume of English housing efforts is of interest to Americans for two reasons, first, as illustrating a new field in which local municipal authorities can serve their constituencies. For many years cities have built streets, sewer and water systems, parks and playgrounds, town halls and auditoriums, public markets and municipal docks and even voted large subsidies to manufacturing companies to insure their location in the city—all these expenditures of public funds and many other similar ones have been made to insure the health, pleasure and prosperity of the city's citizens. The national housing shortage adds a new and overwhelmingly important demand for municipal aid either in the form of subsidies



ENGLISH GARDEN CITY METHOD OF DECENTRALIZING INDUSTRY.

or in the loan of the city's credit, thus insuring a low rate of interest on capital used in house construction. The importance of securing a low rate of interest for

*See *"Housing"* page 316 under date of May 24, 1920.

Cost of Recent Houses (English) **Receiving Approval and Assistance From Government*

Cost as Approved	Non-Parlor Types: Livng Room, Kitchen and 1 Bed R	2 Bed R	3 Bed R	4 Bed R	Ave. Cost Per House	Parlor Types: Parlor, Living Room Kitchen and 2 Bed R	3 Bed R	4 Bed R	Av. Cost per Hour	Total No. of Houses
$2500—	4	--	134	--	$2200	--	32	--	$2300	170
$2500—$3000	--	199	719	--	$2850	13	174	--	$2850	1105
$3001—$3500	--	241	2238	6	$3300	--	636	2	$3350	3123
$3501—$4000	--	183	5653	3	$3800	--	3533	89	$3800	9461
$4001—$4500	--	78	797	4	$4140	81	8723	314	$4260	9997
$4501—	--	5	149	--	$5200	11	3008	177	$4760	3350
	4	706	9690	13	$3630	105	16106	582	$4210	27206
			10413				16793			

(1) Average cost of 27,206 houses is $4000.00 (£1 = $5.00).
(2) Of these houses 21,390 were in urban districts and 5,816 were in rural districts.
*Housing May 24, 1920.

capital used in house building is of first importance. Realizing this fact the Canadian federal government has granted $25,000,000 as loans to municipalities for house buildings at 5% interest, thus losing 1½% interest.

If it should be found that present laws do not suffice to allow this being done in the United States then new ones must be secured to the end that the most vital possession of all—a home may be furnished to even the most modest citizen. A decent home is the safest insurance against the vagaries of bolshevism.

A second lesson furnished by the English experience is this: All classes of citizens are responsible for present bad and inadequate housing conditions and all must interest themselves in the problem and contribute to its solution. The general supscription to local housing bonds now being made in England points a practical and most efficient manner in which the average citizen can show his interest in the most vital problem which faces America, in fact faces the world. To continue the present laissez faire attitude or to hesitate because of real or fancied obstacles is unworthy of progressive America. If new laws are needed by way of extending the power of municipalities to build houses for their citizens, or even if the state constitution must needs be amended, Wisconsin certainly will continue to protect the vital interests of its citizens in the future as in the past. We have already at least one American state which has had the courage and the statesmanship to serve as an example. (Massachusetts.)

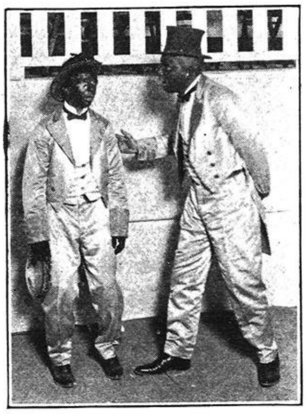
Private companies have scant ground on which to base objection to municipal co-operation and assistance. Experience of the most enlightened European countries shows that there is room for all possible housing efforts, private and municipal. Who can believe that in our own America where competent authority has shown the present imperative need of 1,000,000 houses the field can be filled by private means alone. The country has always depended upon private capital to supply housing needs, with the result that even before the war a great deficiency in housing was widespread over the entire country. The importance of providing a home based upon American standards of living for every family, however humble, is too vitally important to the security of American ideals and American institutions, to be longer neglected or left to the chance provision of private endeavor.

More fundamental than the deporting of alien bolshevists, is the adoption of housing policies which shall limit or prevent their creation. The fierce resentment toward society cherished by certain of its members often has a real basis, and the lack of a decent home life is most often the primal cause of this feeling. Jacob Reis has said, "You cannot expect people to live like pigs and be good loyal citizens." In a great and true democracy such a condition should be impossible. We all share the duty and the responsibility of making it so.

THE ENGINEERS' MINSTRELS OF 1920

By Wilson D. Trueblood
Junior Chemical

The 1920 Minstrel Show is history now; the last traces of burnt cork have been erased from the end men's faces, and the big curtain is safely packed away. In fact everything is gone but the substantial bank balance and a host of memories, which, for those who took part in the show, may be summed up in the work "work".



Tambo Schmidt and Bones Pierce.

It all started last May when, at a mass meeting of all engineers, Foster Strong assumed the burden of directing the production. Active work began the last of September with the appointment of the staff. Tryouts were held soon afterward, the cast and orchestra were selected, and rehearsals were begun for the grand climax which occured on Friday and Saturday nights, November 12 and 13, as a part of the 1920 Homecoming celebration.

The grads will probably wonder why the show was not given on St. Patrick's Day as it used to be. A conflict on the University Calendar forced the committee to change the date, and it was finally decided that the old grads who came back for the Homecoming would welcome a chance to see an old time pep show. And so the date was fixed. The next thing was to find a place.

The Fuller was booked with a road show, the high school auditorium was too small, and the Open Air Theatre back of Bascom Hall was considered inappropriate for the middle of November. The only place remaining was the gym, and it was a discouraging place from some points of view. "Bes" Bespalow, stage manager, got out his surveying instruments and a slide rule and tried to lay out the place. Among other things he found that it would take a curtain 60 by 90 feet to satisfy the requirements. The business manager took up the matter at this point and made some inquiries. He found that there was only one curtain in the Northwest large enough to cover the space. It was in the Milwaukee Auditorium and was valued at $12,000. Just when the staff was ready to surrender, Fred Goetz, production assistant, walked in and announced that he could ated for the sum of $425. Statistics presented in the Cardinal claim that the curtain contained one mile of cloth a yard wide and enough paint to supply the local co-ed chapter for one whole day.

In the meantime the cast had been selected and work on the show begun. R. H. Damon, who has had four years professional experience in minstrel work, was secured as a coach. It was at this time, too, that Red Taylor received the job of Interlocutor. Melvin Pierce, Lewis Schmidt, Sherman Green, Roy Redin, John B. Holmes, Howard Sharp, and Frank Bumer headed the cast as end men.

Barnard Hall was the first to hear and approve the show. No matter how tight the windows were locked in the Lathrop concert room, some of the melody would leak out, and, as a consequence, window space across the way was selling at a premium.

A week before the show Mike Zwicker, Sherman Green, and Roy Enders, with several others, dolled up in burnt cork and bright red velvet suits and toured the evening dances. At the Candy Shop they created a regular jazz riot; but at Thompsons the teahounds became frightened, and the boys in red left in sheer pity. Coming back they celebrated by running the Dean's car into a telegraph pole.

Interest was again aroused at the Homecoming mass meeting by Cap Rasmussen, Fritz Nolte, and Roy Enders in the same becoming costumes.

After Wednesday of Homecoming week, sleep was merely a word to those engaged in the production. Thursday night a stage 40 by 50 feet was erected at the north end of the gym and the curtain was hung in place. The costumes arrived from Chicago, after a week's delay. Willard Kates collected a dozen or more ushers. Henry Ford gathered together a force of janitors to arrange the hall after the mass meeting Friday evening. Malcolm Mitchell gave the final adjustments to the lighting, and everything was ready to start.

At 8:45 Friday evening, Nelson Fairbank lifted his baton, and an orchestra of fifteen struck the first chord of the overture. The opening scene showed the men in a semicircle, the ends in full dress black face and the chorus in colonial costumes and white wigs. Then the fun began. The crowd of hardy engineers, dressed in their best corduroys and clean flannel shirts, would hardly let the last note of a song die before starting applause, and caused numerous encores.

Red Taylor performed his role with credit—he went through without a break. The ends, Henry Stegeman as Dumb-Bell and Sherman Green as Dynamite, were perhaps the best of all.

For an hour and a half the plumbers sang their way through the program, which included a selection of the latest melodies. A saxophone quartet, headed by Don Bohn, and a banjo solo by Davies were special numbers.

From a financial standpoint the Minstrels was a complete success. The gym afforded space for 1500 reserved seats and 200 rush seats. The receipts for Friday night were $1104, and those for Saturday were $1358, making a total of $2462. Bert Williams, tax collector for the State of Wisconsin, issued a tax exemption certificate, thereby enabling about 10% more to be turned over to the Memorial Union fund. The total given to that fund was $650.

THE ENGINEER'S MINSTRELS OF 1920

FOSTER STRONG, *General Chairman*
HENRY J. WARMUTH, *Business Manager*
D. PONGRATZ, *Ass't Business Manager*
WILLARD KATES, *Head Usher*
WILSON TRUEBLOOD, *Publicity Manager*
FRED GOETZ, *Production Assistant*
EUGENE BESPALOW, *Stage Manager*
HENRY FORD, *Floor Manager*
NELSON FAIRBANK, *Orchestra Leader*
MALCOLM MITCHELL, *Chief Electrician*
ALICE LIGARE and EDITH SWARTZBAUGH, *Secretaries*

CAST

END MEN

Lewis Schmidt	TAMBO
Melvin Pierce	BONES
Henry Stegeman	DUMB-BELL
James Mackie	RASTUS
Sherman Green	DYNAMITE
Roy Redin	SASSAFRAS
James Holmes	DEW-DROP
Howard Sharp	SNOWBALL

CIRCLE

"Hap" Davies	MORNING GLORY
Ken Damon	SUNFLOWER
James Price	HOLLYHOCK

Herbert Muth	G. P. Ryan	J. T. Strate
S. H. Gregg	C. C. Congdon	B. C. Lanning
Foster Newell	Ole Seitz	Alfred Cotton
F. F. Bovingdon	E. H. Lunda	R. T. Beglinger
E. G. Liebert	C. Dunn	Harrington Yost
A. J. Huegel	Halmer Peterson	

ORCHESTRA

Jesse Cohen	Carl Hoppert	Robert Eddy
Warner	Phil Nolte	C. Campbell
Gordon Head	Perry Moon	R. Strock
J. K. Kolb	P. Wenger	M. Taft
H. L. Gibson	Don Bohn	
Jerry Whale	L. Shapiro	

MUSICAL NUMBERS

1. "Badger Cheer" - - - - - *ensemble*
2. "Dixie is Dixie Once More"—*entrance of circle and ends*
3. "Everybody's Happy" - - - - *ensemble*
4. "Everybody's Happy When the Goose Hangs High" - - - - - - - - - - TAMBO
5. "I've Got the Blues for My Kentucky Home" SUNFLOWER
6. "Dukke Lise" (*banjo solo*) - - MORNING GLORY
7. "Look for Me in Tennessee" - - - DYNAMITE
8. "Play Me a Dixie Melody" - - - HOLLYHOCK
9. "Song of the Southern Moon" - - - *quartette*
10. "When I See All the Loving they Waste on the Babies" - - - - - - - - - DUMB-BELL
11. "Amorita" and "Stop It" - *Saxophone Quartette*
12. "Bow-Wow" - - - - - - - SASSAFRAS
13. "Honolulu Eyes" - - - - - - SUNFLOWER
14. "Read 'em and Weep" - - - - - - RASTUS
15. "Emma Lou" (*duet*) - DUMB-BELL and SNOWBALL
16. "Coon Band Contest" - - *Hard Shoe Specialty*
17. "Sleep, Baby, Sleep" - - - - DEW-DROP
18. "Down the Trail to Home, Sweet Home' and "Alabama Moon" - - - - - - - - *quartette*
19. "Early to Bed and Early to Rise" - - SNOWBALL
20. "I Love the Land of Old Black Joe" - SASSAFRAS
21. "Dixie Made Us Jazz Band Mad" - - *ensemble*
22. "Good Luck, Lads" - - - - - - *ensemble*

THE CHEMICAL ENGINEERS' COURSE IN CHEMICAL MANUFACTURE

By L. C. Harvey and L. E. Buckingham
Senior Chemicals

Without a doubt, the busiest place on the campus during the past summer was the Chemical Engineering building where the annual summer course in chemical manufacture was given. In connection with the manufacture of chemicals from raw materials and from wastes, we made analyses of the ingredients used and of the products obtained, and also assembled much of our apparatus. All of the Chemical Engineering building with its entire equipment was placed at our disposal to use as best fitted each problem.

THE CHEMICAL ENGINEERS IN THE MANUFACTURING COURSE—SUMMER 1920

The twenty-nine men enrolled in the course were paired off, and each pair given a problem to work out. Union labor had nothing on us; we were at the laboratory from eight in the morning until five in the afternoon with one hour off for lunch. Saturday afternoon was declared a holiday.

At the first meeting of the class Professor Kowalke outlined the course for us, assigned us our problems, and told us what we should do and what we should not do,—with emphasis on the latter. After the assignment of problems, many blank expressions were in evidence and remarks like, "What is lithopone?", "What does pyroligneous acid look like?" were heard. Few suggestions concerning the solution of the problems were given; we were left largely to our resourcefulness.

Our first task was to analyze the raw material to determine what could be made from it. Ah, there's the rub! Every chemistry book in the library was called into service for a method of analysis. Here many of us discovered that we should not believe everything in a text book, for often many analyses were tried before one was found that would work. In other words, "many were tried, but few were chosen." Often when we met an obstacle in the work we sought the assistance of our "boss." He would be very apt to say, "It is clouding up, but I don't think that it will rain," which, translated, means, "Better try another method and I think you will come out all right." It was just such occurrences which taught us to use our heads and not to give up too quickly.

The first hour of each day was usually spent in conference where we discussed the work of the previous day and reluctantly told of our troubles. During one of these conferences, we were astounded at the announcement from a member of the class that, according to his figures, a carload of lime per day would be required to soften the water for a 50-h. p. boiler plant. After a little juggling of the computation, it was found that about one pound would do the work very satisfactorily. Another member of the class said that he had found sugar most effective to decolorize the caustic soda which he was making. With sugar at thirty cents a pound and caustic soda at four cents, this was a most startling disclosure. It was hushed up before the newspapers got hold of it. See "Red" Hawkins for further particulars.

Our manufacturing plant turned out a diversity of products. We will mention here only a few, such as, the extraction of alumina from bauxite, the production of toilet soap from kitchen grease obtained from Lathrop Hall Cafeteria, the manufacture of prussian blue, a paint pigment, from spent iron oxide obtained from the purifiers at the gas works, the recovery of potash from the sea weed known as kelp, the fractionation of crude petroleum for the production of gasoline and

THE ORIGINATORS OF VO-PO—THE WONDER SOAP

lubricating oil, the transformation of waste automobile crank case oil into high grade lubricating oil, and the recovery of alcohol from waste residues obtained from the university pharmaceutical experiment station.

In solving these problems we also learned how to use chemical factory machinery effectively. A rectifying still has many interesting and puzzling characteristics; an oil still can boil over with no provocation at all; and we thought that the operation of a filter press was easy, but it can, on occasion, develop more leaks than a sieve. In addition, calcining furnaces, centrifugal machines, vacuum pumps, and crushing machinery were used to make our products.

Because of the interesting business possibilities, several promising chemical companies were formed. Among these may be mentioned the VO-PO Company of which "Fritz" Pope was president and general manager and A. C. Vobach was secretary-treasurer. They were the manufacturers of the well-known wonder soap, guaranteed to soften the skin and preserve the youth. It is said that they are now at work on another soap to remove the scales from fish. The Nash-Knapp Oil Refining Company at one time threatened to become a rival of the famous Rockefeller organization until a leak in the still allowed their precious fluid to run out on the floor of the laboratory. The Ramsay-Braun combination had perhaps the most enviable job of the bunch for they were recovering pure alcohol. Boy, page John Barleycorn!

After the completion of each problem we were required to write a detailed report on all operations of analysis, calculations, cost of manufacture, and our conclusions as to the practicability of the problem.

THE THINGS THAT WERE PRODUCED

The course was beneficial in a great many ways. It taught us to be resourceful; it caused us to review a great deal of the work we had done previous years; and it familiarized us with the use of much apparatus which before that was entirely unknown to us.

The last two days of the session were spent in cleaning the apparatus and re-arranging the laboratories. A stag ice cream social under the trees near the Chemical Engineering building was a fitting climax to five weeks spent among most enjoyable as well as instructive surroundings.

THE WESTERN MINE INSPECTION TRIP

By RALPH L. JOURDAN
Senior Miner

On the 18th of June, 1920, the Wisconsin Mining Engineers started on their western inspection trip. Before the war the trip was taken every other summer, but during the war, and the year following, it was impossible to take advantage of a western tour. Now that everything is running smoothly, it is hoped that every mining engineer will have the opportunity of taking such a trip before he leaves the University.

We met in Chicago Friday evening. Several of the boys arrived just in time to get the train before it left for Lincoln, Nebraska. As all of them had just finished a strenuous week of exams at the university, they were glad to crawl into their berths and sleep while the train sped on toward Nebraska. We arrived in Lincoln the next afternoon about supper time. While we were waiting for the Burlington train which was to carry us on our way the boys grabbed a little lunch at a "dog wagon" in Lincoln. We didn't have a long stop, however,—not even long enough for "Checko" Tsao to buy any post cards. Tsao created a shortage of postcards in every town in which he stayed for more than one hour.

Early Sunday morning we steamed into Edgemont, South Dakota, and immediately jumped onto the crowded "jerk water" train which runs to Lead, South Dakota. "Gus" Lundberg, the writer, and several other fellows, squeezed into a day coach, while "Mark" Link and Mr. Shorey and the rest of the boys rode in style in the Pullman. The scenery along this short line is wonderful, and while the relief is not as great as in some of the western mountains, the beautifully colored cliffs and the densely wooded slopes were as grand a sight as any on our trip to the coast. Nothing exciting happened on this part of the trip, although we just missed a wreck by one day. On our way back we saw where the engine had jumped the track and plowed up the dirt along the road bed.

It was almost night before we entered Lead. "Mark" Link, an old timer around the town, headed straight for "Susie's" boarding and rooming house. Susie welcomed us with a wonderful meal that was enjoyed most heartily by every one, except McKinley. He had met a girl on the train and it seemed to affect his appetite.

We got up early the next morning and donned our digging clothes. Mr. Clark, of the Homestake Mining Co., took us through the assay plant. We watched the pouring of gold ingots and the only thing that kept "Jack" Holmes from running off with a $25,000 gold brick was that several shot guns were hanging on the wall and a big .45 Colt was swinging under the left arm of each of the employees in the assay office.

We next inspected the great steam hoisting engine at the B. & M. shaft. It is capable of raising 6 tons of ore at a speed of 3000 feet per minute. Mr. Clark then took us through the head house where the ore is crushed before it enters the stamp mills.

Mr. Brooks, the efficiency engineer, took us down into the mine. Some of the boys had never been underground before, and the writer for one was a little shaky when he stepped into the cage. The operations at the Homestake mine are carried out on a large scale. The ore is hauled by compressed air locomotives, which also assist to ventilate the mine with their exhaust air.

While in Lead we visited the stamp mills and the sand and slime plants. Gold is recovered by the amalgamation process in the stamp mills and by cyanidation in the latter plants. We also visited the Trojan Gold Mine which is the one other large mine now operating in the district.

After leaving Lead we returned to Edgemont, and then started for Butte Montana. We crossed the continental divide early Sunday morning and in a few minutes more we arrived in Butte. All of us were as hungry as wolves and "Stew" Turneaure led us to Rampous' Cafe. He made a hit with one of the waitresses, and after that whenever any one wanted to find "Stew" all that was necessary was to go to Rampous'.

On Monday morning, June 28, we visited the Leonard Mine. The ore there is mainly copper sulphide and arsenide with iron pyrites and quartz as a gangue. The stones are large and the mining is very extensive. The mines are "fairly" deep, some going below the 4000 foot level.

While in Butte, we visited the Black Rock Mine and the mill of the Butte Superior Mining company as well as the Pittsmont Mine mill and smelter.

From Butte we took the B. A. & P. electric train to Anaconda, Montana. Here all of the copper ores of the Anaconda mines are milled and smelted. The plant is extremely large, and it handles vast amounts of material. Copper, sulphuric acid, and arsenic are some of the most important products. The copper is smelted in reverbatory furnaces and converters and is refined in small refining furnaces. Sulphuric acid and arsenic are byproducts. The fumes and gases caused by the smelting are led into an immense chimney over 585 feet tall and in this way they are dissipated into the atmosphere before they can do any harm. Mr. Bernard, an old Wisconsin man, loaned us a man from his department to conduct us through the plant.

We happened to be in Anaconda over the Fourth of July and if it is a dry country at least there are several oases in it. Warren Walters chartered a big Cadillac Eight so he would be able to get a better view of Anaconda. None of us could figure where he got all of the money for such a wild venture.

From Anaconda we returned to Butte and then proceeded to the Coeur D'Alene. We chugged into Wallace, Idaho, just before sunset, after passing over some of the most wonderful mountains in the West. Upon finding a hotel, "Mark" and the writer tried to promote an automobile ride. We were almost successful, but at the last minute fate turned against us.

Mr. Shorey made arrangements for a trip through the Hecla Mine, which is located at Burke. The train was to leave at seven a. m., but Checko, Mark Taynton and myself overslept, and the boys had to hold the train for us. Mr. Cook took us through the mine in the morning and then Mr. McCarthy invited us to a real dinner at his mine boarding house. Next to "Susie's" dinners, I believe this dinner beat anything on the trip.

That afternoon we visited the Hercules lead and silver mine. This is one of the best equipped mines in the world. There is a large underground hoist which raises ore from a 1400 foot shaft located 12,000 feet in from the mountain side. We also visited the mills which separated the lead sulphide, or galena, from the waste rock.

While in the Coeur D'Alenes we also visited the Morning Mine at Mullen, the Tamarack and Interstate mines in Nine Mile Canyon, and the Bunker Hill & Sullivan mine mill and smelter at Kellogg, Idaho.

After winding up the trip in the Coeur D'Alene, Mr. Shorey, Warren Walters and Mark Link went to Seattle and then returned home via the Canadian Pacific. "Gus," "Checko" and myself worked in Burke at the Hecla

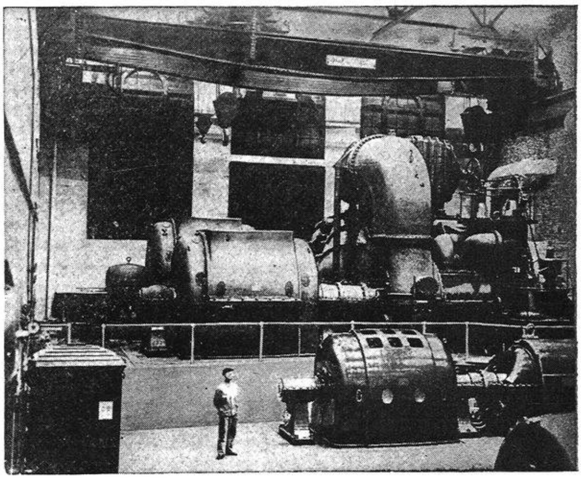
Mine. Later, "Checko" spent most of his money in Portland. He took long auto rides along the Columbia River Highway, and even rode in an aeroplane.

All of the boys enjoyed the inspection trip immensely, and we believe that it was worth while from every standpoint. The only way that the boys can appreciate the value of such a trip is for them to take it, and those of us who have taken the trip will guarantee that it is a wonderful opportunity that should not be missed.

WESTINGHOUSE TURBINE MAKES A WORLD'S RECORD

What is believed to be a world's record for the continuous operation of large steam turbines was established at 5:20 p. m., March 8, 1920, when the 45,000 k. w. turbine of the Narragansett Electric Company was stopped for the first time since the early morning of December 15, 1919. This continuous operation covered a period of 84 days, 11 hours, and 36 minutes. The machine is a multiple element steam turbine of the cross compound type and was manufactured by the Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa.

A total of 51,104,000 kw-hr. was generated during the run, considerably more than the total yearly output of the Narragansett Co. for any year prior to 1915. The average



"Westinghouse Turbine Generator That Holds World's Record"

daily output was three or four times the maximum possible annual output of the first machines owned by the Narragansett Company. During this record run the turbine generated about 84.2 per cent of the total station output. Another interesting feature is the wide variation in load from a minimum of 6000 kilowatts to a maximum of 41,000 kilowatts.

The machine used approximately 609,000,000 pounds of city water, which required over 71,000,000 pounds of coal to convert it into steam at 210 pounds pressure. To condense this steam, and maintain an average vacuum of better than 28 in., approximately 32,000,000,000 pounds of water were taken from and passed back to the Providence River. The twin-condenser pumps are driven by two 512-h.p. turbines and are capable of circulatin 18,000,000 pounds of water per hour. Because about 80 per cent of the total heat in the steam is absorbed by the condensing water, which is turned back into the river, the city of Providence is enjoying among its many great advantages that of having a heating system continuously warming the waters of the Providence River, thereby keeping the upper reaches of the bay open to navigation all through the severe winter.

Some conception of the enormous amount of steam and air used by this machine may be had by some homely comparisons. During the present run, sufficient steam was passed through the machine to equal about 540 times the entire weight of both electric and steam ends and the bedplates. Also, to keep the generators cool, over 18,000,000,000 cubic feet of air were passed through the generators, which equals 2000 times the total weight of the generators and their bedplates. Sufficient air is pumped through the generators each hour to fill the turbine room seventeen times.

Not the least important feature that contributed to this record operation is the self-contained lubricating system which contains 800 gallons of oil. The oil is pumped through the cooler—which keeps down the temperature—to the bearings at the rate of 600 gallons per hour, and, in addition to lubricating the bearings and dissipating the heat due to friction and other causes, it is used to operate the main admission valves. Considerable importance is attached to the oiling system, since its failure for thirty seconds would wreck the bearings, and possibly carry destruction to other parts of the machine. An auxiliary is kept ready for immediate use, to prevent any such occurrence.

The spindle, or revolving part of the high-pressure element, with its generator rotor, which together weigh nearly fifty tons, and turn at a speed of 1800 revolutions per minute, made a total of 218,980,800 revolutions. Had it been possible for a fly to remain on the tip end of one of the blades during this trip, he would have made a journey of 1,300,000 miles,—approximately fifty-two times the distance around the earth, or five and one-half times the trip from the earth to the moon.

This run is the more remarkable in that the unit consists of two turbine generator sets, each of which has been operated independently of the other, so that in effect the result has been the mechanical equivalent of operating a single machine continuously for 169 days.

When the machine was installed early in December there was no thought whatever of more than the ordinary weekly run, but abnormal weather conditions brought about such a demand for power that it was not considered advisable to shut it down until the date mentioned above.

SUPERFLUOUS PROMISE

The Lover—"Promise me, darling, that you will never let any one come between us!"

Darling's Father (in the background)—"From what I can see of you I don't know how any one can!"

—*London Mail.*

EDITORIALS

THE MINSTRELS

The Engineers' Minstrels have been carried to a successful conclusion, and the traditional activity of the college has not lapsed to oblivion. Those who carried the burden of the responsibilities gave freely of their time, and in many cases, without thought of midsemesters. Their actions deserve praise, not only for the production, but for the fact that they have revived the event which places the engineer before the remainder of the school more than any other single event. They have also given to the Union Memorial fund substantial evidence to show that the engineers are behind it.

THE CONCRETE SHIP

We are printing in this number, the first of a series of articles on the development of the concrete ship. About a year has been spent in working out this plan and in preparing the articles. It seemed to the editors a particularly appropriate series because so many of our Wisconsin alumni have taken a prominent part in the development of the concrete ship.

At the time that the submarine was sinking such an appalling tonnage of ships, attention was directed to various means for making up the loss. Steel and wood were the materials that most minds turned to. They had been used for the purpose in the past and represented no new thought. A few original minds conceived the idea of using concrete, a material that, at first thought, seems hopelessly inappropriate. The idea was not altogether new, for barges and small boats had been constructed of concrete before this time, but the idea of making a sea-going vessel—one that could meet the stress and shock of ocean storms—was an innovation. There was much opposition to the proposal, but it had enough backing so that the Emergency Fleet Corporation formed a Concrete Ship Section.

Among the Wisconsin men in this organization were E. E. Parker, in charge of the Concrete Design Section, S. C. Hollister, in charge of the Concrete Surveying Section, and W. H. Wetzler, chief of the Drafting Section. J. Glaettli, Jr., J. P. Schwada, F. C. Thiessen, H. Stock, and L. F. Boon were other Wisconsin men who had an important part in the work. It is said that Wisconsin men became so numerous in the organization that a ban was placed against them. One day the chief desired a man for a certain class of work and asked for available men. He looked over the list that was handed to him and picked out a name. "There's the man we need," he said. "But Chief," the secretary replied ,"He's a Wisconsin man." the chief scratched his head. "Well," he answered, "He's the man we need." And the ban was lifted.

What the future of the concrete ship will be cannot be predicted at this time. It has been demonstrated that a ship of concrete is seaworthy. Whether it will stand the test of time is the big question. Even though it should not prove successful in the end, the time and money spent in developing the concrete ship will not all be lost, for it has resulted in the collection of a large fund of information in regard to the stresses that occur in a ship, and has laid the basis for scientific ship design.

FOR THE LOVE OF MIKE—USE DISCRETION

When one of Bud Fisher's heroes is chasing the other one over the landscape with a meat ax or a toy cannon, the chasee invariably implores the chaser to "use discretion." We wish to infringe upon Bud Fisher's copyright and beg each and every student to use discretion during the next few weeks. There will be a great temptation, while you are buzzing around the old home town, to make yourself out to be quite a heller, at the expense of the fair name of your alma mater. Don't do it. Make all the impression you can by fair means, but go easy on the stories that may be misunderstood by those who do not know that college life is, fundamentally, a life of hard work and achievement. The tale of your adventures will be quite interesting enough if you stick to facts. What you, a Wisconsin man, say and do has more effect than you may realize.

STATE OWNED DORMITORIES

The coming session of the state legislature is to be asked to appropriate $300,000 to build dormitories for students. This legislation is something which no intelligent body of men should turn down, if the facts are clearly presented. The proper housing of students has become the most urgent need of the university, due to the enormous increase in enrollment since the war, and the condition is growing worse as the number of students increases with each year. The construction and operation of a large dormitory should involve no financial loss to the state if it be properly managed; small, privately owned dormitories are operated at a profit. Aside from the financial aspect of the proposition, the very great benefit to the student body is apparent. Increased school spirit, better scholarship, and a stabilizing of all room rents will result if the appropriation is made.

H. M. R.

DISCIPLINE AND THE ENGINEER

It has been said that the younger generation has little respect for authority, and feels little of the regard due to age and experience. Whether such a statement is true or not is a question, but, however that may be, the experience of several millions of that same younger generation in the army did little to increase their love of discipline and healthy restraint. The discipline governing the engineering profession is more severe than that of the army could ever hope to be. The success of any engineering undertaking depends upon the loyalty and obedience of subordinates to their superiors, as well as upon ability and team-work, and the young engineer who fails to realize the necessity of unserving loyalty to and confidence in his chief is doomed to failure in his chosen profession. The old truism that, "he who would command must first learn to obey," holds doubly true for the engineer, who bears so often the tremendous responsibility for not only the vast sums of money expended in great projects, but also for hundreds—perhaps thousands—of lives. The young college graduate, flushed with his new-found knowledge, will do well to remember this and school himself to a proper attitude of wholesome respect for authority and experience. H. M. B.

ARE YOU BUSY?

Thomas Edison, busiest of men, reads 52 technical publications regularly. Don't you think it wise for us to spent as much of our spare time as we possibly can in the libe? Edison might have worked as hard as he has worked and thought as hard as he has thought, but unless he had formed the habit of learning the results of other peoples' labors, it is doubtful whether his success would have been possible. He says that genius is 1% inspiration and 99% perspiration. He also tells us that each of his inventions requires on the average 7 years to complete, and that his hardest problems are solved through help obtained from publications. If Edison, with all his wonderful mental powers, finds it profitable to read these 52 technical publications regularly and to read no end of books and other publications, why shouldn't we at least acquire that all important reading habit?

M. K. D.

THE DOOR HAS HINGES

Last year's enrollment in the University, which established a new record, has been exceeded, and the University buildings are correspondingly crowded. We find the Department of Economics using Agricultural Hall and the Commerce department using the Engineering auditorium for regular lecture periods. Every morning, at certain hours, some four hundred commerce students attempt to force their way out of the auditorium and through the front door of the building. Why must they use the front door, thus causing congestion on the front steps and walk, which at some times extends so far as to interfere with traffic on the main walk? The Engineering building has one main exit, some two and a half or three feet wide, and a back door which no one ever uses. The Engineering department should consider the advisability of making a special exit from the auditorium. And why is the front exit only two and one-half or three feet wide? Upon several occasions I have observed that the west door of the main exit has hinges and can be opened. Evidently it was made for use. Well—let's use it, and not delay the students outside. O. A. R.

GLAD TIDINGS: A WISCONSIN CREW ON THE HUDSON

Athletic Director Tom Jones says that Wisconsin is to be represented in the Hudson races beginning either this coming spring or a year later. Alumni and students will be equally pleased at this announcement and will hold their fingers crossed so that no evil jinx will prevent its fullfillment. Wisconsin crews in the past did much to spread Wisconsn fame in a most creditable manner. They were made up of a clean lot of sportsmen who never failed to create a good impression for themselves and for their university.

DR. COTTRELL TALKS ON PATENTING RESULTS OF SCIENTIFIC RESEARCH

"No body, in the whole system of our country, is charged with the duty of studying and protecting the interests of the public in patents," said Dr. Frederick G. Cottrell, Director of the United States Bureau of Mines, who spoke at 11 a. m., November 23, in the auditorium of the Engineering Building to the engineering students. We have the Patent Office and the courts; but the Patent Office is charged only with deciding whether an invention is patentable and issuing the patents. It cannot even correct its own mistakes, but must let them exist until a court acts. There is no court devoted exclusively to patent litigation.

Dr. Cottrell described the unfavorable conditions that surrounded the business side of research at the University of California where he taught at one time, how dissension was apt to arise over the results of research if they were commercialized, and how attempts were made to eliminate undesirable features in these conditions by assigning patents to the regents of the schools. This way of handling matters resulted in some improvement, but it also had its defects; it showed a tendency to create a spirit of commercial rivalry between institutions of learning that would prevent a free exchange of information. Some other method had to be developed.

Finally, in 1912, the Research Corporation, made up of a number of business men, was organized for the purpose of handling the patents held by universities and similar institutions. The corporation does not attempt to do any manufacturing; it conducts a licensing business instead. It is hoped that this corporation may, in time, become international in scope.

A Merry Christmas and A Happy New Year.

ENGINEERING REVIEW

By M. A. Hirshberg

STELLITE

"Stellite," states the Metal Industry, "is becoming a widely used alloy." The original composition of cobalt, chromium, and tungsten or molybdenum gives a hard alloy which is better than high speed steel for lathe tools. The later developments (binary alloys of cobalt-chromium) and modified stellite, (the binary alloy with iron added) have a wide application in industry. The binary alloy is used in the form of dental and surgical instruments and pocket knives. The cobalt, chromium, and iron alloy is manufactured into table knives. All of these alloys are immune to every atmospheric condition. Knives of stellite may be used for cutting any fruit without the slightest discoloration of the blade. A new and interesting application of the malleable stellite is as a substitute for gold in the manufacture of pen points for fountain pens. The tips of these pens may be made of the extremely hard stellite, a substitute for the expensive iridium, and the rest of the points are made of the malleable alloy, to which the hard tip is welded. This application is particularly practical, because the metals replaced are far more expensive

POWER FROM THE SUN

According to a writer in the American Machinist, our power supply is going to present a serious problem in the not too distant future. No matter how efficiently we develop our water power, there is not enough to go around. Barring the discovery of additional coal and oil, we shall have to produce the extra power needed by some process which will use the energy as it comes to us rather than the energy which has been stored up for a long time. In other words, we shall have to make use of the sun's rays. Direct harnessing is not practical, so that the one solution for concentrated power from the sun seems to be alcohol, from the fermentation of vegetable matter. We have many factories, now inactive, which could readily be turned over to the manufacturing of denatured alcohol. If we go on an alcohol basis for power, we will truly be using the energy from the sun at very close hand. Vegetation depends on sunshine and water. The water comes because the sun has evaporated it from the large bodies of water, and the growth producing sunlight comes direct. This energy cannot possibly be exhausted in a time within our conception.

METHANOL PLANT

The Acetate Products Co., Ltd., has purchased the old Liverpool Cannery Plant at South Westminster, B. C., and will commence the installation of an up-to-date methanol (wood alcohol) plant at once. The company will make methanol, calcium acetate, several wood tar products, and charcoal. This is the first methonal plant to be erected on the Canadian Pacific coast. There are to be two plants of a similar nature in eastern Canada, one in Ontario, and the other in Quebec.

USES OF ARSENIC

Chemical and Metallurgical Engineering offers a list of the uses of arsenic. The metal acts as a flux for other metals, promoting the union of metals which would otherwise be difficult to mix. A small percentage of arsenic added to copper used for sheets, tubes, and bolts for locomotive fireboxes, will increase the tensile strength, hardness, and resistance to the action of gases. It reduces blow holes and increases fluidity in copper castings. The melting point and conductivity are lowered. A higher percentage of lead may be carried in a zinc alloy by the addition of metallic arsenic. A finer grain and increased hardness is secured by adding the metallic arsenic to white bearing metals. Metallic arsenic is also used in the manufacture of speculum metal for mirrors in large telescopes. Research in the field of the uses of arsenic is scarcely touched as yet, and is only in the preliminary stages.

A SEA WALL OF COMPRESSED AIR

A simple but effective means for breaking up the power of sea waves has been found in the use of compressed air. As sea walls and piers are expensive and have often proven ineffective against wave action. the practical value of the compressed air apparatus has been put to severe tests in different localities. It has been found that air forced through perforated pipes placed on the bottom near the entrance of the harbors would expand upon rising and overthrow the waves. The water back of the pipes proved to be as effective as that back of a reef. Besides being effective, the compressed air device has the advantage of not being as unsightly as other methods of harbor protection.

FIREPROOFING WOOD

A process by which timber is made fireproof has recently been made public in England. The wood is submitted to a steaming and vacuum treatment which removes the air, moisture, and sap, following which it is saturated, under pressure, with a solution of chemicals which replace the elements driven out. The chemicals, in minute crystal form, remain embedded in the fibres. The effect of this treatment is explained thus: In the presence of heat the crystals form a glossy coating which excludes the oxygen of the air and thus renders flames an impossibility. The wood may be charred completely through without bursting into flames.

ALUMNI NOTES

By David W. McLenegan

Homecoming brought back quite a crowd of the old boys, who signed up on the register and decided that the old place hadn't changed very much after all. They gave us the following information about the former "plumbers":

Jesse F. Alexander, e '11, is distributor for Pennsylvania for the Kewanee Private Utilities Co., manufacturers of private water supply, electric light, and sewage disposal systems. His office is Room 928 Presser Bldg., Philadelphia.

Grover C. Almon, m '17, is in the experimental department, Gisholt Machine Co., Madison. Residence: 705 Orton Ct.

Edmund J. Arps, e '14, is the manager of a business at Chilton, Wis.

C. F. Balch, e '17, is a special investigator in the research deptartment of T. M. E. R. & L. Co., and resides at 431 45th St., Milwaukee.

N. D. Barnett, m '15, is a construction engineer, 2013 People's Gas Bldg., Chicago.

K. C. Barrows, e '20, is enrolled in the student course at the Western Electric Co. plant at Hawthorne, Ill.

David S. Blattner, e '19, lives at 465 Lyman Ave., Kenosha. He is engaged in production work at the Nash Motors plant.

Charles W. Blodgett, c '17, is instructor in civil engineering at the Carnegie Institute of Technology, Pittsburgh, Pa.

A. F. Bodenstein, c '18, was married recently. He lives at 932 Willow St., Green Bay, and is employed by the Green Bay division of the Highway Dept.

H. H. Brown, c '17, is with the Prime Manufacturing Co., Milwaukee, Wis.

Ben S. Buckmaster, m '16, is in the experimental department of the Hyatt Roller Bearing Co. His residence is in Beloit.

Charles L. Byron, e '08, a patent attorney of Chicago, was elected vice-president of the Chicago Wisconsin Club at the meeting preceding the Chicago game.

R. H. Candlish, c '17, resides at 10 S. La Salle St., Chicago.

Bernard M. Conaty, c '18, is in the Chicago office of the Wallace & Tiernan Co.

B. L. Conley, e '18, EE '20, is an instructor in electrical engineering at the Case School of Applied Science.

Arthur W. Crump, c '15, resides at 416 Kenilworth Place, Milwaukee. He is a valuation engineer for the American Appraisal Co.

A. E. Cummings, c '15, is with the Raymond Concrete Pile Co., 143 Cedar St., New York.

Merrill W. DeMerit, e '14, is in the distribution engineering department of the Detroit Edison Co., 402 Lincoln Bldg., Detroit. His residence is 963 Eastlawn Ave., Detroit, Mich.

The engagement of Ronald I. Drake, ch '20, to Miss Mary Alice Newton, a student at the University, was recently announced.

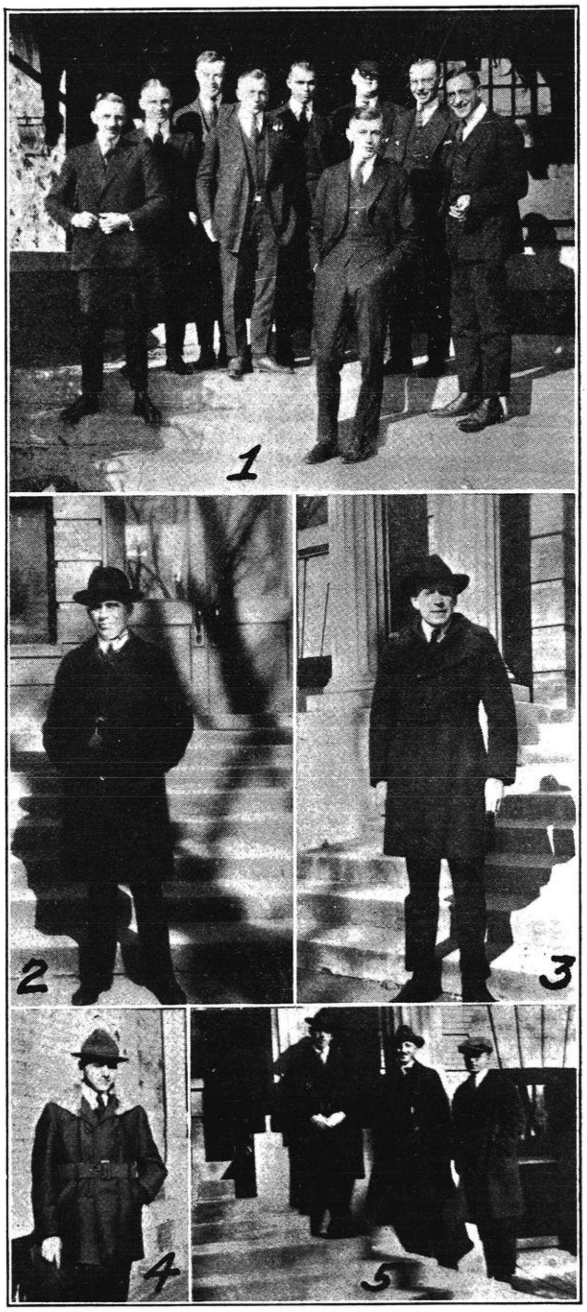
C. L. Erickson, m ex-21, is in the hardware business at Mondovi, Wis.

Finley L. Fisbeck, c '19, war manager of the ENGINEER, is in the sales engineering department of the Wallace & Tiernan Co., at the Chicago office in the Peoples Gas Building. The company handles chlorine control apparatus for water and sewage purification, bleaching, and industrial work.

E. W. Fisher, c '16, is a partner in the Fisher Auto Company, Mondovi.

Wm. A. Goss, c '15, is vice president of the Federal Appraisal Co., Chicago.

Alfred U. Hoefer, m '06, has changed his name to Alfred U. Harper. He is telephone engineer with the Chicago Telephone Company, Room 1901, 212 W. Washington St., Chicago. His residence is 2227 Pioneer Rd., Evanston, Ill.



Back for the Homecoming
1. The Theta Xis. 2. W. D. Barnett. 3. W. J. Rheingans. 4. Frank Karger. 5. Ladwig, Knoerr, Griswold.

Robert Holverscheid, m '11, is a coal merchant at 4649 Iowa St., Chicago, Ill. His home address is 801 North Euclid Ave., Oak Park, Ill.

A. G. Hoppe, m '17, is engaged in locomotive testing for the Chicago, Milwaukee & St. Paul R. R.

W. T. HOPKINS, c '13, formerly with the Railway Department, has just returned from Constantinople after three years in the U. S. Navy as a lieutenant commander. During this time he did not get back to American waters, but traveled over nearly all parts of Europe.

CLIFFORD E. IVES, m '19, is an engineer with the Fairbanks-Morse Co. and lives at 632 Milwaukee Road, Beloit, Wis. "JOE" DRESEN, m '20, is also an engineer for the same company.

GORDON G. JOHNSON, m '17, is a technical investigator with the Western Electric Co., and lives at 1515 W. Monroe St., Chicago.

J. HUGO JOHNSON, e '11, is professor of electrical engineering at the University of Idaho, Moscow, Idaho. His residence is 821 Elm St.

OSMUND M. JORSTAD, g '04, C. E. '05, is General Engineer with the Westinghouse Electric & Mfg. Co. His home address is 423 Ave. D., East Pittsburgh, Pa.

FRANK KARGER, c '20, is an assistant engineer with T. M. E. R. & L. Co., Milwaukee, and resides at 1316 Cedar St.

LOUIS A. KIRCH, c '18, is with the Peoples Gas Co. of Chicago.

CARL F. KOTTLER, e '18, is now with the Wisconsin Mat Company at 392 Sixth St., Milwaukee. His mailing address is 1033 Second St., Milwaukee.

C. KRUGER, e '16, and J. H. GEFKE, e '17, are with the Wisconsin Telephone Co., at Milwaukee, Wis.

HENRY KURTZ, c '19, is with the Peoples Gas Company of Chicago.

WM. J. LADWIG, e '20, is a protection engineer with the Wisconsin Telephone Co., Milwaukee.

LYNN N. LILLESAND, e '20, was married to Miss Avis Hurd of Madison, on Thanksgiving day in New York City. They will make their home in New York.

JOHN R. MANEGOLD, e '13, is chief engineer of the Dings Magnetic Separator Co., Milwaukee. He resides at 3025 Highland Blvd., Milwaukee.

HARRY E. MERENESS, e-ex '13, signs himself: "Residence Engineer, Public Service Bldg., Milwaukee." He resides at 496 27th St.

"PAULIE" MEYERS, ch-ex '20, was recently married to Miss Mildred Starr in New York. Miss Starr graduated from the University in 1916, and is a former teacher in Madison. They will make their home in New York.

E. B. MORSE, e '18, is engaged in estimating and cost work for the Valley Iron Works Co., Appleton. Wis.

WALTER S. NATHAN, e '18, is a development engineer with the Cutler-Hammer Co., Milwaukee, resides at 602 Frederick Ave., Milwaukee.

H. S. OLDENBURG, m '15, is an engineer with the Federal Rubber Co., Cudahy. His residence is 1823 Cherry St., Milwaukee.

CHARLES A. RAU, e '17, is chief Engineer of the Corn Products Refining Co., Pekin, Ill. His address is 342 Buena Vista Ave.

CLYDE W. READING, min ex '21, is attending the University of Illinois. He lives at 401 E Green St., Champaign, Ill.

E. R. SAGEN, m '14, is a signalman on the Northern Pacific Ry., at Belgrade, Mont. His address is Box 374.

FRANK J. SARIDAKIS, m '04, is a construction engineer with the Cooper Engineering & Manufacturing Co., Chicago. His residence is at 4849 N. California Ave.

JAMES A. SCHAD, c '16, was married to Miss Marjorie F. Carlton on August 21, at Calumet, Mich. Miss Carlton graduated from the University in 1917. "Jimmie" is at present engaged in the construction of a new plant for the Columbia Grafonola Co., at Orangeville, Md. His address is 2059 Kennedy Ave., Baltimore, Md.

N. J. SCHMITZ, e '16, is engaged in construction work for the Valecia Evaporated Milk Co., of Madison. He has just finished work on the company's new plant at Sparta, Wis.

H. E. SCHRADER, m '20, is managing engineer for the Blackmer Rotary Pump Co., Petoskey, Mich., who make pumps for everything, he says, from beer to molasses.

PROF. SCHUSTER, e '99, former assistant professor of electrical engineering, has been in Wisconsin for the past few weeks at Waukesha and other points on business. He stopped at Madison for a short time on Wednesday, October 3, while on his way to his Dakota farm where he had left his automobile. He expects to motor to his home in Pasadena, Cal.

E. S. SCHRANK, m '18, is in the engineering department of the Consolidated Water Power & Paper Co., at Wisconsin Rapids, Wis. He entered the employment of this company on September 1, of this year.

LAWRENCE F. SEYBOLD, e '18, is an engineer in the Research Bureau, at the Public Service Bldg., Milwaukee. He lives at 372 Irving Place, Milwaukee.

J. D. STEWART, e '20, is with the American Steel & Wire Co., at Waukegan, Ill.

R. A. SWITZER, e-ex '20, lives at 410 Bluff St., Beloit, Wis.

C. R. THOMAS, ex '15, has charge of the publication of results at the Forest Products Laboratory, Madison.

RUSH E. THOMAS, c '16, was a homecoming visitor. He tells us that in the long interval since he was last in Madison he spent a year (1918–19) as instructor in civil engineering at the University of Colorado, and another year as district engineer in the Wyoming Highway Department.

HAROLD D. TIMM, m '20, student engineer, Cutler-Hammer Co., lives at 1425 Cedar St., Milwaukee.

KEARNEY WALTHERS, e '16, is assistant sales manager of the Mechanical Appliance Co., Milwaukee, Wis. He has a son, Bruce Julius, 14 months old. "Some boy" according to what his Dad says.

CORNELIUS G. WEBER, e '08, is assistant chief engineer with Vaughn & Meyer, consulting engineers, 501-502 Security Bldg., Milwaukee. His residence is Apt. 9, 501 Marshall St.

HAROLD D. WILE, e '12, is in the insurance business in Chicago.

The marriage of JOHN B. WILKINSON, m '16, ME '17, to Miss Katherine Morris of Madison, was recently announced. John was recently elected national vice-president of Pi Tau Sigma.

L. P. WORKS, e '19, visited us during Homecoming. One of the first things he did was to put his "John Henry" on our subscription list. 'Atta spirit, Larry. He is engaged in transmission line work for the Columbia Construction Co., Green Bay. Wis. His mailing address is Box 468, Green Bay, Wis.

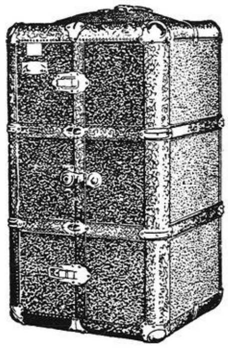
W. H. ZAMZOW, ex-e '22, is with the Kearney-Trecker Co., Milwaukee, Wis.

CLYDE W. READING, min-ex '21, is attending the University of Illinois. He lives at 401 E. Green St., Champaign, Ill.

WALTER A. ZINN, m '98, is vice president of the Evinrude Motor Co. His residence is: 909 Hackett Ave., Milwaukee.

Work has begun on the new Wisconsin General Hospital which will eventually house the medical school and the state hospital for public use. The main structure only will be built at present but the final unit will comprise a main building with extensions from both ends and from the center. The location is north of University Ave., between Warren and Charter Streets.

A co-ed states that she has been going with an engineer but she doesn't think engineers are very desirable because they always have to hurry home to study. Maybe so, maybe so, Clarice, maybe he is a Tau Bete. And then, again, maybe he is just diplomatic.



The Capital Times prints the following interview with "Leonardo" Taft who visited Madison on November 23:

"Well, what do you want me to say," he smiled quizzical ly at The Capital Times reporter. "That I think Madison is very beautiful? Oh, they all say that? Then let me say that I am very blad indeed to be heer again and see my very good friends and the beautiful city. Nothing has bore o rbetter influence than beauty in the home town."

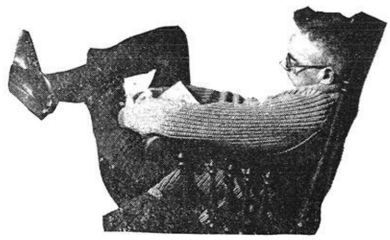
Question: Who was jazzed, Rado, the reporter, or the linotyper, and where did the culprit get the vile stuff?

What are we going to do about the Nelson Trophy? We have had it standing in our lobby so long that we feel naked when it leaves us to repose in the domicile of the Agrics. Let's get busy and bring it back. The Minstrel Show isn't going to use up all the ginger in the college. There is the football team to consider first. Outside all you heavyweights, and put us in the running, and we'll follow a good lead throughout the season.

Dean Goodnight spent Thanksgiving Day skinning a deer that he shot up in the woods.

CAMPUS NOTES

By Frederick W. Nolte



"Read 'Em and Weep" sings Rastus Mackie. Well, if you feel that way about it we'll go over and join the Ag Mag and write their "Cockle-burr" department.

The kindhearted prof. giveth not assignments over the Christmas vacation. Rather he saveth them until the stude returneth in the cruel, white cold of the New Year, with his morale 40 degree below par, and then letteth him have it, hip and thigh.

Lots of vacation this Christmas. Time to catch up on those reports.

The wise lad will get that ticket for home before buying the Christmas presents.

Take some of that vacation time and write the article for the Engineer which you have promised yourself to write these many moons. It will do us both good.

What a mess of "trips" we have with us this time. And they seem to be such sinful affairs too. Sh-h-h-, there are some folks on the campus that mustn't hear; but we have it on good authority that one of the miners flirted with a girl on the cars, that another lad almost learned to smoke, and that as much as fifteen cents changed hands in a single game of pitch that disgraced the electrical-mechanical trip.

One story that you will not find in the reports of the recent trips concerns a little poker game that the fellows let a girl passenger horn in on. Oy! Oy! She knew the game and they only thought they did.

Football? Certainly, if you want football backwash you shall have it. It was a great season with the Conference teams pretty evenly matched.

Wisconsin had the best team since 1912. With all due respect to Ohio we feel that Weston's early retirement in that game caused our defeat and gave Ohio the championship. Red was an essential cog in the passing machine as was demonstrated in the Illinois game.

Allen Davey, quarter back has the satisfaction of winning three games in the last two years. He won the game with Chicago last year by running through the field for a touchdown in the last minutes of play. This year he licked Chicago again with a place kick. He did the same thing in the Minnesota game.

Ohio, the champion, won her games by a narrow margin and in the final minutes of play in the games against Wisconsin, Chicago, and Illinois; but don't think that Ohio isn't a real champion. It takes a thoroughbred to do that sort of thing consistently. Once might have been a fluke, but three times in a row indicates class. A team that keeps on trying to win right up to the whistle deserves to win. Wisconsin can take pride in Ohio's performance for the Ohio coach is Jack Wilce who was Wisconsin's star full back in 1908 and 1909.

The four teams that finished at the top of the percentage column, Ohio, Wisconsin, Indiana, and Illinois, all have Wisconsin graduates for coaches.

Harry Margoles

Harry Margoles is the lone representative of the College of Engineering on Wisconsin's great football team this year. He played at left guard all season, forming one of the links in that stonewall line. Margoles, who is a Milwaukee boy, is a senior in the civil engineering course. He entered from Marquette University in the fall of 1918. That husky physique was developed by firing a locomotive on the C., M. & St. P. Railway.

The four teams that finished at the top of the percentage column, Ohio, Wisconsin, Indiana, and Illinois, all have Wisconsin graduates for coaches.

"Well, Chicago ran true to form," says Old Timer. "Whenever the gloom is particularly thick over the Chicago camp, and the place is all littered up with cripples it is a sure indication that Chicago's enemy is due for a clawing. I've watched these games for twenty years and its all old stuff. Those three points that Davey booted look as good as a row of touchdowns to me."

MINSTREL AFTERGLOW

Six hundred and fifty berries is what the Minstrel Show contributes to the Memorial Union Building. Not such a bad show, we'll say.

It was quite a feat to hold a mass meeting for the Illinois game in the gym, and and a little over an hour later, to stage a minstrel show there.

No cracks were taken at the engineering facuity, and so was another tradition shattered.

The old time "olio" was missing, but a number of specialties were scattered through the singing.

Favorites? Well, let's see. How does Dumb-bell Stegeman strike you? He seemed to throw so much enthusiasm into that song about the loving that's wasted on babies.

Why didn't they let Bones Pierce sing? He does beat the bass drum so grand.

It was a good show and the College of Engineering is under obligations to the men whose hard work put it across.

THE SORE-EYE SPECIAL

The sore-eye special soon will leave upon its mournful journey. Its passengers will sigh and grieve,—they're worsted in the tourney. All confident they landed here; bright visions filled each bosom, and hope beat high with ne'er a fear. Alas, their end is gruesome. They spent their working hours in play and tried to bluff their mentors. We don't see how they got that way for they were bum inventors. The tricks they thought so cute were old when Bascom Hall was builded. Their hopes, that seemed of purest gold, were all base metal gilded. 'Tis sad that folks must burn their mitts before they learn their lesson. It gives their doting parents fits; but we can't let them mess on. They either hit the ball or go; there is no other choosing. The sore-eye special's waiting, bo; the trip is not amusing.

MALT BASIN

Some rare words turn up in "seminar". Someone brought in *pachymeter,* which is the name of an instrument designed to measure the thickness of paper. No one in the class knew what it meant. The instructor suggested that the words pachyderm might serve as a clew. A great light broke over Mr. Hinkley. "Why, its a speedometer on an elephant," sez he.

John Price says that Charley Corp isn't the only faculty man who can tell a bear story. Johnny and his wife "summered" in the woods. A big she bear and cub dropped in on them one morning before they were ready to receive visitors. Its a thrilling tale, but we would only spoil it. Let Johnny tell it.

At the annual fall banquet of Tau Beta Pi, the following men were initiated:

Honorary Membership
Professor R. S. McCaffery.
High Junior
Merrit A. Giles.
Seniors

Henry Ford	P. W. Romig
S. H. Gregg	D. J. Stewart
G. L. Lundberg	A. R. Striegl
A. E. Montgomery	H. D. Taylor
P. D. Reed	A. Vobach

The November 24 issue of Engineering and Contracting contains an article by Professor L. S. Smith on, "The Garden City and English Housing Laws." The same issue also contains a reprint of Professor M. O. Withey's article on "Ten Year Tests Showing the Effect of Age and Curing Conditions on the Strength of Concrete" which appeared in the November issue of the ENGINEER.

PI TAU SIGMA CONVENTION

A convention of Pi Tau Sigma was held in Madison on November 12 and 13, delegates from the Wisconsin and Illinois chapters attending. The constitution of the society was revised, and applications for new chapters were considered. The Illinois delegates were entertained at a supper at the City Y. M. C. A., where the work of the society for the coming year was discussed. The following officers were elected: National president, Prof. Willard, University of Illinois; vice president, John B. Wilkinson, m '16, of Wisconsin; secretary, Prof. Larson, of Wisconsin. After the banquet the whole party took in the performance of the Engineers' Minstrels.

Eta Kappa Nu, honorary electrical engineering fraternity, announces the election of the following juniors: Howard M. Sharp, Clarence F. Rasmussen, and Frederick W. Nolte.

Pi Tau Sigma, honarary mechanical engineering fraternity, announces the election of the following students: Seniors, Jack Rubenstyne, Willis R. Terhorst, Marshall Bautz; Juniors, Merrit A. Giles, F. A. Buese, M. K. Drewry, T. B. Maxfield.

A notice on the bulletin board reads:

FOUND
In Room 229
Pipe and—

No, indeed, Hannibal, the pipe referred to is not the kind you fire up when you sit down to an earthwork problem, N'ither is it a veiled reference to one of the courses given in Room 229, for verily that room is no place for pipe dreams. It must be some other kind of a pipe.

So long fellows. Have a good time, and don't bring the chicken-pox back when you return.