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THE WISCONSIN ENGINEER

NGINEERING
SOCIETY OF
WISCONSIN
ISSUE

APRIL

1938

Member, Engineering College Magazines, Associated

WELDING is responsible for a majority of the streamliners now racing about the country. Burlington's Zephyrs, the Boston & Maine's Flying Yankee—all made of stainless steel—and the Pennsylvania's new super-electric locomotives, all owe their form and much of their efficiency to welding. Welding makes possible tremendous savings in weight without sacrificing strength and rigidity.

Streamlining . . .

Demands smooth, unbroken surface and strong, light frames—both attained by welding

"STREAMLINING" is more than a word to catch popular fancy and assure sales. This design trend, in automobiles, trains, ships and a vast variety of equipment items, has several extremely sound reasons for existence. Smooth mass-distribution and unbroken surfaces mean ease of operation and savings in power for moving objects. This smoothness of design also results in easier handling of portable objects, as well as cleanliness, simplicity and efficiency.

Streamlining involves the method of construction, the theory behind the design. Streamlined articles are unit-built of strong, light materials. The entire product is designed to be one-piece and to develop the maximum strength of each individual member with the minimum of added weight.

Welding is the most practical, least expensive and surest means of attaining permanent strength in metal fabrication. A welded article is a single unit when assembled, and always remains so. There are no mechanical joints to jolt, jar or work loose with the passage of time. Various members can be depended upon to develop their full, assigned reactions now or ten years from now. Welded construction, therefore, means more than adequate economy in design and construction. It means confidence in the permanence and adequacy of the product.

Welding allows the designer to specify any shape or combination of shapes without limitation. By welding, complex forms can be built up from simple units. Metal can be cut away or added. Projections, lugs, ears, rods, bars, any member —can be added to the foundation. Dissimilar metals can be joined. Long-wearing or corrosion-resistant alloys can be used to reinforce or build up at sections subject to special wear or abrasion.

In fact, welding relieves the designer of many limitations, of most of the old inhibitions and joint problems of old-fashioned design. It makes possible the fabrication of a better, more serviceable, longer-lived product at lower cost. The essential advantages of modern design are obtained by welding with convenience, economy and assurance.

Welding Savings

The New Haven "Comet" uses cromansil steel engine beds and car trucks, all welded. Cromansil, a high-tensile mild-alloy steel containing chromium, manganese and silicon, was chosen as best for high-strength, rigid members. Welding was specified because it develops the full strength with minimum weight.

* * *

Stands for automatic vending machines are now stronger, better, more permanent. They used to be made by screwing lengths of 1½-inch pipe into cast iron bases. They are now bronze-welded at less cost with obvious improvement in strength, durability and ease of fabrication.

* * *

Welding makes stainless steel beer barrels practical. Strong, light, smooth inside and out, these barrels have no crevices or corners in which fungi and bacteria can breed. Welding makes them all one-piece and prevents bacterial and mold action and chemical off-tastes. Further, because of welding, they outlast all others.

* * *

Welding produces gas-operated refrigerators at a reasonable production cost. After making exhaustive tests involving every method of fabrication possible, the manufacturer standardized on welding 100 per cent. Results include a better product, more flexibility in design and lower manufacturing costs.

* * *

Welding makes modern metal furniture production possible. Faced with tremendous competition, this new industry capitalized the advantages of welding in the production of light, strong, modern designs and has grown to a sound and healthy state. Welding in this case means mobility in design as well.

* * *

Every day welding is being used in the production of different articles. For instance, an order was recently received for 2000 window display fixtures. Welding was specified because welding permits any design, gives neat appearance and a strong sturdy assembly at low cost.

* * *

Tomorrow's engineers will be expected to know how to take advantage of this modern metalworking process. Many valuable booklets describing the oxy-acetylene process are available without obligation. For further information write any Linde office.

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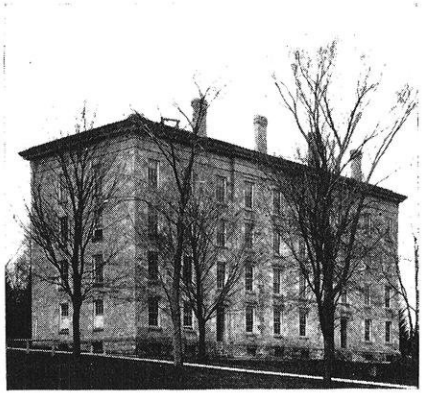

North Hall

WITH THE CONTRIBUTORS:

- This issue, as is traditional with the Wisconsin Engineer, is devoted to the Engineering Society of Wisconsin.

- Roadside Development in Michigan, page 123, written by V. B. Steinbaugh, Chief Engineer for the Michigan State Highway Department, contains an interesting account of roadside improvement.

- A description of one of the latest low cost pre-fabricated houses developed by the Forest Products Laboratory is given on page 126.

- On page 129, an account of two of the sample interviews conducted by Mr. Evans for the E. P. G. is presented in the hope that they will be of some help to the men who have not as yet experienced their first interview.

- The story of Stainless Steel is depicted in photographs following page 130.

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The "Big Dipper"

Roadside Development in Michigan

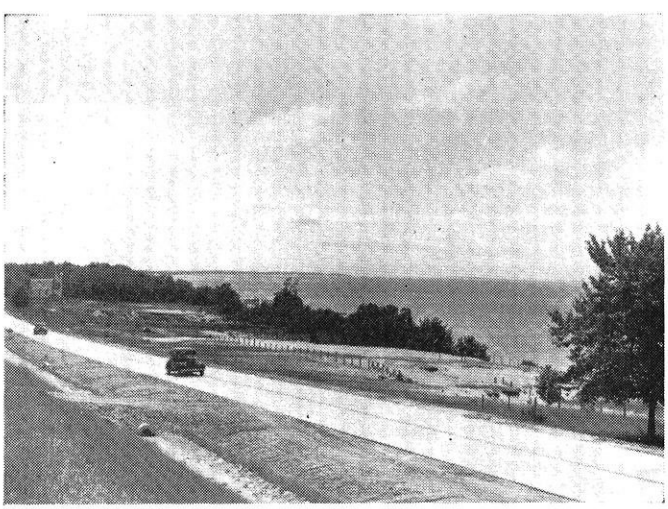
By **V. B. STEINBAUGH**

ROADSIDE improvement is one of the more recent developments in highway engineering. In fact, it is only in recent years that the public has given the highway engineers a chance to think about this phase of their work.

With the development of automobiles there came a pressing demand for more and better roads. The automotive engineer did his part and produced a machine that made former speeds seem like a snail's pace. He was closely followed by the highway engineer who directed his efforts toward improving highways so that motorists could travel faster and farther. Transportation was the goal. The appearance of the roadside or the country through which the highway passed was then a minor consideration. Roads, roads, and more roads was the cry on all sides.

With ribbons of concrete and other types of highways stretching for miles in all directions, the novelty of driving over them began to wear off. It was not enough merely to guide an automobile along a highway as it connected one town with another one. So far as commercial traffic was concerned, those first highways served their purpose.

But then, as now, a large proportion of the traffic on our roads was composed of tourists and pleasure motorists. We no longer have to guess at this fact. The Michigan Highway Planning Survey has shown that 60 per cent of Michigan's traffic which exceeds 10 billion vehicle miles annually, is social and recreational. Motorists today are demanding something more than a roadbed, and I believe that our modern highway engineers are obligated to provide it. Modern highways must have an aesthetic appeal if they are to measure up to their full requirements.



A Typical Michigan Highway

There are several rather definite policies of roadside improvement followed by the Michigan State Highway Department. None of these policies or activities involves a large expenditure in terms of the dividends it pays. The objective is a well-rounded program of roadside development.

One of the first and most elementary steps is the sodding of backslopes. Right along with this work comes the planting of trees and shrubs along steep banks or along highways which are not protected by natural growth.

Under the present policy of the State Highway Department, trees along the trunklines are inspected at least once every three years. Dead limbs are removed and if the tree is of questionable value because it is nearly dead, it is removed. In this connection we have a strict control over the activities of public utilities using the state right-of-way for pole lines. No work can be done without first securing a permit from our office. Any tree trimming necessitated by the erection of pole lines is done on the side of the trees farthest from the traveled portion of the road.

It should be pointed out that the preservation of roadside timber is not alone a matter of planting and spraying. Our present right-of-way policy has much to do with it. Where trunkline highways pass through virgin forests, we buy 400 feet of right-of-way on each side of the road. In this way, roadside timber is protected from the lumberman's ax and preserved for the generations to come.

Generally speaking, the kind of roadside development I have mentioned so far can be considered a part of routine maintenance functions.

Roadside improvement is not merely a covering up process. It is true that many roads have been built so that they are scars across a once beautiful landscape. While strenuous efforts should be made to cover these scars and restore nature's own handiwork, we must start our work much earlier.

To develop a highway system that has aesthetic as well as utilitarian value, early planning of the roadway itself is necessary. In other words, instead of waiting until the finishing touches have been put on a new highway before giving thought to its aesthetic qualities, we should start our work with the location engineer, and then follow through with each successive step of development.

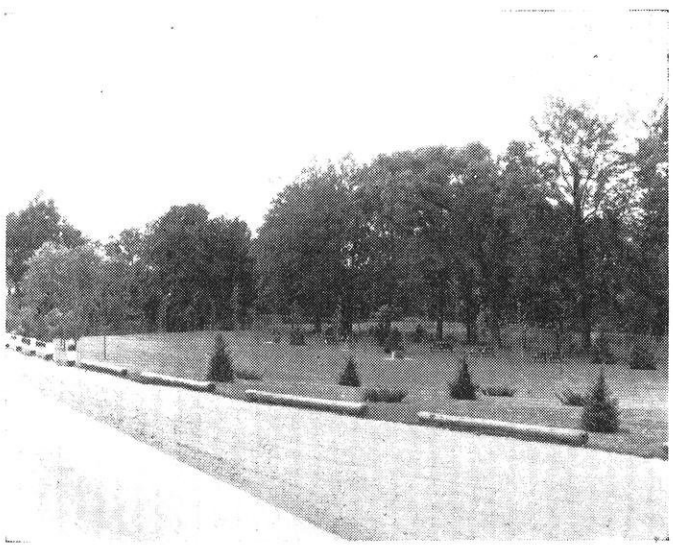
The location engineer and right-of-way buyer probably have more to do with the ultimate beauty of a highway than any other persons in a highway department. Proper design and construction cannot be neglected, however.

Location of the highway should take advantage of the

natural beauty of the country. Without sacrificing distance or economy it is often possible to bring a new highway into view of an inland lake, a rock formation, a woods or a river. And with proper study, unsightly or uninteresting country can be avoided.

Michigan has 2,200 miles of shoreline on four of the Great Lakes. Already great stretches of this coast line are connected with shoreline highways. State Highway Commissioner Murray D. Van Wagoner has made notable strides on what some day may become a continuous scenic highway in Michigan bordering the Great Lakes.

Our standard for the construction of a coastal highway is that motorists may view the water at least 50 per cent of the time. This does not mean that a highway must follow the beach all of that distance. A panorama of the lake from a high hill two miles back from the water often has more charm and appeal than a closeup view.



Landscaping on U. S. Highway 16

One of the outstanding examples in Michigan of this type of highway is the shore road, US-2, northwest from St. Ignace to Brevort in the Upper Peninsula. This stretch of highway skirting Lake Michigan is a re-location of old US-2 which is far inland. The re-located scenic highway has cut the driving distance nearly in half from St. Ignace to Brevort saving 17 miles as compared with the old route.

Re-location of old roads bringing into use modern appreciation of attractive landscape features offers a great opportunity for improving the appearance of our highways.

Good practice in design and construction must not be overlooked. If the highway traverses rugged country a great deal can be accomplished in designing graceful curves. Safety requirements have ruled out the sharp, flat curves common in the past, and at the same time improved the appearance of the road.

Rounded back slopes and shoulders which blend with the landscape and the avoidance of sharp ditch lines all help in attaining symmetry and balance in the finished highway.

Having covered some of the important factors in new highway construction, let us turn our attention briefly to the vast mileage of highways that were built from 10 to 30 years ago when less attention was given to aesthetic qualities than today. Far greater mileage is involved in these roads than in newly constructed highways. What can be done to improve the appearance of these older highways?

Effective selection, arrangement and planting of shrubs, evergreens and deciduous trees, in time will help immeasurably to improve the appearance of highways leading through barren country.

In Michigan the planting of long stretches of roadsides through uninteresting country has given way in the last three or four years to the concentration of work in the roadside parking developments which now dot the highway system. These developments give the highways an atmosphere of restfulness and welcome.

And with a relatively small amount of money to spend for roadside improvement a much better total effect can be obtained by doing a complete job in a small area than by spreading the work thinly over three or four miles.

Here's the way the Michigan highway department goes about building a roadside parking area. At many points throughout the state, the department owns more right-of-way than is required for the road itself. Those points which have outstanding scenic possibilities are carefully selected and examined for further development. Undesirable underbrush is removed. Sometimes trees are removed and transplanted to give a more pleasing appearance or to open an especially scenic view. At other points additional trees, native to that section of the state, are planted to improve the appearance of the area.

A rustic theme is followed throughout. Any buildings such as shelter pagodas, well shelters, or comfort stations are built of logs and with rustic design. Rock work is also frequently applied—especially around springs or streams where pools or small cascades can be constructed. Adequate parking places are provided adjacent to the highway and paths lead to various points throughout the development. Rustic picnic tables are also provided and pure drinking water is near at hand.

These roadside parking areas or stopping places should not be confused with the general policy of placing picnic tables along the roadsides. For the past few years the department has made it a policy to place roadside tables at frequent points along the highways. These tables are set out singly or in groups of two or three according to the shade and other features of the place. There will be nearly 2,500 of these tables along the roadsides in Michigan next summer. It was largely due to the success of this policy that the more extensive roadside developments were attempted.

In advocating a continuous and rather extensive policy of landscaping and roadside improvement, Commissioner Van Wagoner has been a hard-headed business man, as well as an advocate of scenic roads.

It has been definitely proved that roadside development

reduces maintenance costs. For example, in Gogebic county in the Upper Peninsula, the average cost per mile of snow plowing varied between $78 on roads bordered by thick forests and $350 on roads completely exposed to the wind.

Consider this, too. A comparison of year around maintenance costs on two gravel roads in the Lower Peninsula —one through forest land and the other through comparatively open country—shows that per mile costs were about 42 per cent lower on the protected road. Not only were snow removal costs reduced, but dragging and dust treatment costs were also much less, due the protection afforded by roadside trees.

Erosion is one of the worst enemies of the highway builder. Wind and rain are constantly at work to tear down and wash away backslopes unprotected by sodding or shrubbery. Thousands of dollars are saved annually by adequate sodding and other erosion control work.

But even economy in road maintenance is not the only justification for roadside development and improvement. Much can be done to promote highway safety through an intelligent roadside program. I have mentioned our practice of preserving and developing stands of roadside timber. The next time you have occasion to drive at night, in a fog, or even in a snow storm, just notice how much you are aided by roadside trees outlining the road.

There is one other safety angle on roadside improvement which perhaps has escaped your notice. As I mentioned before, concentrated roadside developments are provided with driveways and parking areas. It has been found that truck drivers and others who have been behind the wheel for long periods of time are using these convenient places to stop for a few moments relaxation. Frequently they pause for a short nap. Just how many accidents have thus been prevented it would be hard to say. But it is certainly logical to assume that, without a convenient place to stop for a rest, many motorists would continue their journeys though feeling rather drowsy.

Scenic turnouts, or simply additional parking space beyond the shoulder limits also have great safety value, in addition to furnishing real pleasure for motorists. These turnouts are constructed at vantage points along the highways, where there are unusually pleasing scenic views. The motorist drives onto the turnout—pauses as long as he wishes, without danger from other traffic.

The economy and safety of roadside improvement alone go a long way toward justifying a program such as I have described. But there is another value which cannot be accurately determined and which far outranks any others. It is as difficult to ascertain the real extent of this value as it is to determine the real extent of the value of good will in a private business organization. It is difficult to describe this new value because it is an atmosphere or character which is given to the highway system.

I am sure there are those among us who can recall the days before automobiles when highways were friendly, restful places. It was not unusual to pass an acquaintance and stop for a friendly word or two—the horses seldom objected. One had a chance to observe in detail the farms and countryside as one passed. The highway of that day had a friendly and soothing atmosphere.

Contrast this with the highway of more recent years. Hard-surfaced, high-speed arteries built by engineers spurred on by an incessant demand from motorists who were anxious to try out their new-found power. As I mentioned before, the novelty wore off. Mile after mile of pavement becomes tiresome and monotonous.

Today sound engineering is combined with a keen understanding of the relationship between highway engineering and roadside improvement. In other words, we are restoring to our roads a friendly atmosphere through roadside improvement. We might call it "Humanizing the Highway."

We all recognize that the primary service of the highway is and must be to transport persons and goods from one place to another. But at the same time our roads are

An Example of Roadside Improvement

fulfilling this purpose they can be made to serve a more social purpose.

Not long ago a friend of mine returned from a trip through the Ozark Mountains. He marvelled at the scenery which some of the highways offered but he said he had only half enjoyed it. There were no places where he could turn his car off the highway to enjoy an especially fine view. If he slowed down perceptibly, it was only a moment before a truck or some other motorists close behind spoiled his contemplation of the landscape with long blasts from the horn. A few well-chosen scenic turnouts along the highway this gentleman was following would have given it a friendly and sociable atmosphere.

Highways which are pleasant and restful to drive over and which offer the motorist friendly roadside conveniences are essential for the full development of tourist resources. Michigan's tourist industry is second only to Michigan's automobile industry. Estimates of the dollar and cents value of this industry range as high as $400,000,000 a year. We believe that a good share of the return from our tourist industry can be credited to the development of a friendly highway system.

PREFABRICATED HOUSING

By **R. F. LUXFORD, ms'25**

FROM a survey of house consruction in various parts of the United States made by the Forest Products Laboratory it was found that very few houses are being constructed costing less than $5,000. This means that the houses now being built are not aimed at meeting the demand for low-cost housing such as is required by the large proportion of our population within the lower income brackets. In order to explore the possibility of prefabrication of houses, which many people believe is particularly adaptable to low-cost housing, the Laboratory has developed a system of prefabrication employing plywood as the principal material of construction. The full advantages of this type of construction will, of course, be realized only through mass production. As yet houses like the one described here have not reached the mass production stage and therefore the minimum cost cannot be predicted at this time.

The Laboratory built its first prefabricated house in 1935. The system of construction is based on the use of standard units, sections, or panels to be made in large quantities by factory methods, and then assembled quickly and without waste on the site. Its ultimate success will depend on good workmanship and technique in the construction of the plywood and house units, accurate dimension of units, and efficient maintenance.

The panels utilize the "stressed covering" principle so successfully applied in aircraft construction to secure strength and lightness, that is, plywood sheets forming the panel faces are glued to both sides of a structural framing and this becomes a definite part of the load-carrying system instead of being an additional load on the supports as in ordinary construction. The rigid attachment of the covers to the studs or joists by means of glue causes a high resistance to shear between the framing members and cover thus causing one cover to be thrown into tension and the other into compression when resisting an external force. The panel acts essentially as a box girder and this permits the use of relatively light construction to obtain the required strength.

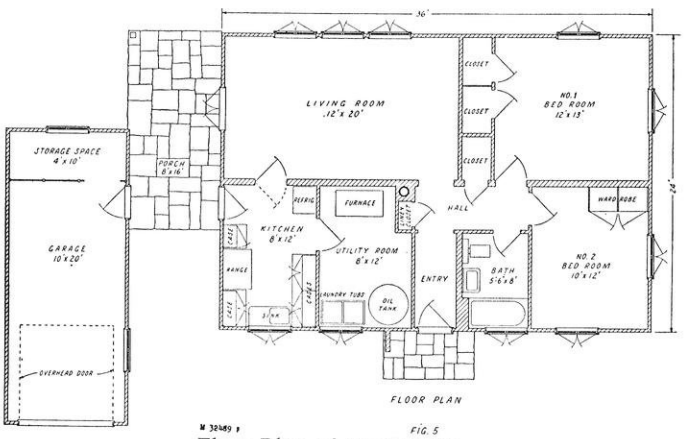


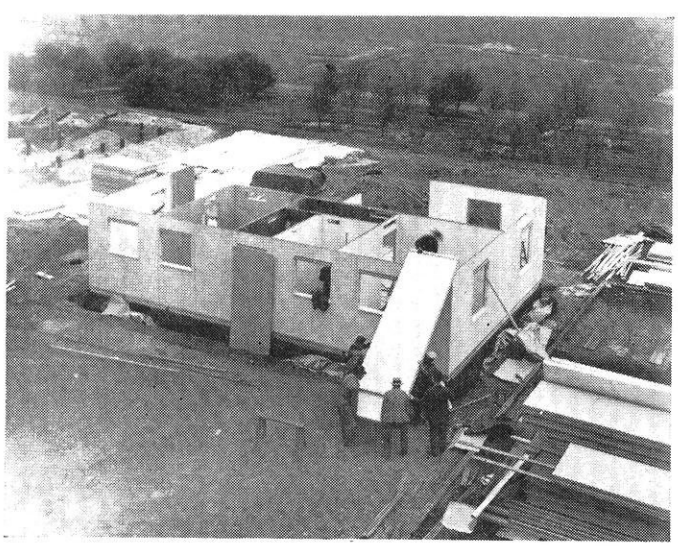
FIG. 5

Floor Plan of Pre-Fab House

This first house demonstrated the feasibility of the sysem. A second one-story prefabricated plywood house which was erected on the Laboratory grounds last November, incorporates the latest findings in housing research. These findings include among other things the use of plywood made up with synthetic-resin adhesive, and provision of moisture barriers within wall, floor, and roof panels. Other interesting features of the new construction are the use of mineral insulation material to increase fire resistance in addition to giving necessary heat and sound insulation, and provision of plywood floors with ⅛-inch hardwood veneer as a wearing surface.

A typical wall section, 4 by 8 feet in area, is shown in details in line drawing. The exterior panels are 3 inches in thickness and consist of ⅜-inch three-ply plywood on the outside, and ¼-inch three-ply plywood on the inside. The framework consists of vertical members made of 1-inch material 2⅜-inches wide, spaced approximately 12 inches apart with two end headers, to which the plywood faces are glued. The partition panels are also 4 by 8 feet. Both faces of the partition panels are, however, of ¼-inch plywood, and the vertical members are 2½ inches wide, the overall thickness being 3 inches.

Experiments indicate that these panels when tested as a



House Being Erected

beam require a load of more than 200 pounds per square foot to cause failure. A 60-mile wind has a pressure of 12 pounds per square foot, which is approximately one-seventeenth the load required to break the panel.

The plywood projects beyond the framework of the panel forming a continuous right-angle groove 2⅜ inches wide and 1¼ inches deep entirely around the panel. A portion of the sill fits up into this groove. A 2½ by 2⅜-inch solid vertical member is fitted into the grooves on the sides of adjacent wall panels. This vertical member serves as a connecting piece between panels, and also carries a part of the roof and floor loads. At the roof a strip glued to the roof panel fits down into the groove at the top of the panel as shown in the details. After assembly, the wall, floor, and roof panels are securely fastened by screws or nails to those parts which fit into the groove, tying wall, foundation, and roof together.

The edges of the face of the panel forming the interior house wall are beveled to form a V-joint when the panels are assembled. The panels forming the exterior surface are beveled on the outside and inside edges, the outside bevel to form a V-joint similar to that for the interior wall surfaces, but slightly opened, and the inside bevel to form a pocket for mastic which is placed between the panels directly after erection. This pocket permits a sufficient amount of mastic to be placed between the panels so that it will retain its plasticity, and hereby make a tight and permanent seal against the entrance of moisture and infiltration of air at the exterior panel joints.

The floor panels are 4 feet wide and 12 feet long. The upper face is ⅝-inch plywood of five plies, and the lower face is ⅜-inch plywood of three plies. These faces are glued to a structural framework consisting of three nominal 2 by 6-inch members spaced approximately 24 inches apart, with end headers. All parts of the panels act as a unit and therefore the panels can be substituted for the usual 2 by 10-inch joists spaced 16 inches apart as ordinarily used in house construction.

The lateral edges of the floor panels are grooved to permit a spline connection for the distribution of weight to adjacent panels. When panels of this type are tested as a beam over a 13½-foot span, more than 300 pounds per square foot are required to cause failure. Accordingly, the panels far exceed in strength any loads normally put upon them.

Except in the kitchen and the utility room, the upper ⅝-inch plywood is faced with birch ⅛-inch thick to form the wearing and finished floor surface. This construction eliminates the necessity of putting a finished floor over a subfloor as in ordinary construction.

The roof panels are similar to the floor panels in construction. The top plywood covering of the roof panels was cut back ¼-inch to allow a groove between the panels, and this groove was filled with a caulking compound. With this size of groove it is believed that the caulking compound in the joint will remain plastic for a long time and, therefore, form a better and more permanent seal. After the joints were filled, the entire roof was covered with a material similar to a thin caulking compound.

Pre-Fab House Completed

All exterior surfaces of the house described here are of hot-pressed resin-bonded plywood. The use of plywood in the past for outside permanent construction has not always proved satisfactory because the glues available were not sufficiently resistant to weathering. With the introduction of the resin type of glues this situation has changed. At present, plywood glued with the hot-pressed resin glues is being used more and more for outside use with every indication that it will withstand the weather indefinitely without the plies separating, provided ordinary care such as painting the edges and surfaces is used. Resin-bonded plywood has also been used for interior surfaces because of its somewhat greater fire resistance which will be mentioned more in detail later.

Coincident with the introduction during recent years of more moisture into homes by means of humidifying apparatus, houses are also being made tighter by the use of storm windows, weather strips, and the more general use of insulation within the walls and roofs. In houses loosely constructed, the moisture-laden air, which flows from the warm inside toward the outside, is easily carried away; however, in houses with good insulation and tighter construction, either of conventional type or prefabricated, the moisture is not easily carried away and when it reaches

(continued on page 135)

Living Room

The Engineer's Parade

By "ENGIN EARS"

ON SATURDAY afternoon of March 19 the sun sank into the Western Heavens with a big smile on its face; it had seen another successful engineers' parade. And certainly the sun and the rest of the elements had cooperated in giving the engineers one of the finest days for the parade since the tradition began.

The honored gentleman of the parade was Johnny Woy, electrical engineer, who had been elected to the lofty position of St. Pat by his fellow slide-rule pushers during the week previous to the parade. He rode in state, being transported, at least for the first part of the parade, in the traditional "coach and four" (minus two) which was well surrounded by the "Guard of Saint Patrick." However, when the parade reached the corner of State and Mifflin streets, Molly, one of the horses, took sick and St. Pat had to be carried the rest of the way on the shoulders of his "Guard."

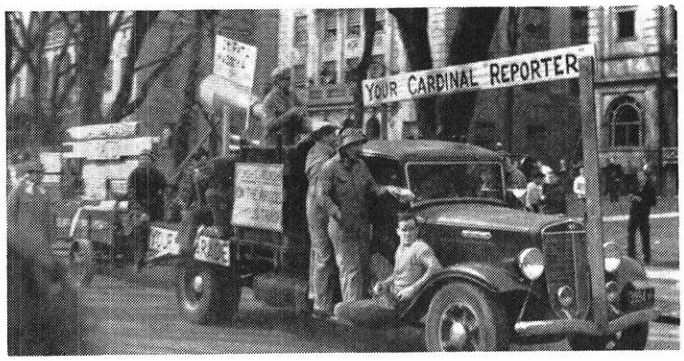
The winners in the WISCONSIN ENGINEER St. Patrick's day photography contest are:

First Place: FRED LOEBEL
Second Place: DICK THEWS
Third Place: VIRGIL KETTNER

These pictures and some of the others entered in the contest are used on the cover of this issue.

The parade, led by a band made up entirely of engineers, got off to the usual delayed start. From 1 o'clock till 2:30 the Madison police held the parade back for fear the engineers might get into a fight! Finally the leaders got impatient and pushed off; a crowd of well over 15,000 people were finally about to see that which they had looked forward to for at least a year!

The parade wended its way up Langdon with only slight delays; of course, eggs and other missiles didn't add to the comfort of the paraders. From the roof of Langdon Hall came a big surprise; the girls had turned against the engineers and were throwing paper bags loaded with water on our regal procession. Some uncouth characters would even dare to come as near as the sidewalk to throw some form of fruit at the parade. When this happened an engineer, ready for battle of any sort, would attempt to show the misguided soul better ways. Of course, this type of strategy resulted in black eyes, bloody noses, and bruised faces for both sides.

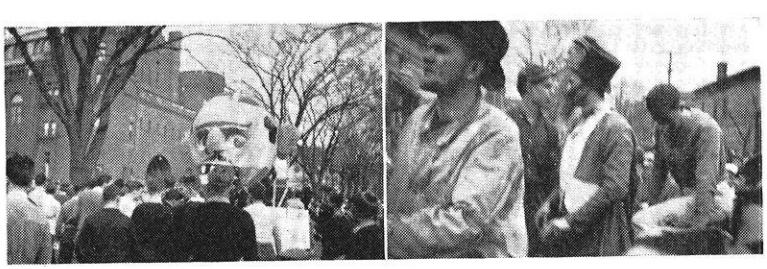


The police, realizing that the demonstration had gone somewhat farther than their wildest nightmares, raced ahead and re-routed the procession directly down State street instead of first rounding the square. State street was the scene of the worst fighting in the history of the annual tradition. The eggs, garbage, and other odds and ends were flying so thick and fast that even the sun had to turn its face. More than once one shyster grabbed another to throw at the parade; after all, it is rather hard to tell one rotten egg from another. Onward marched the royal battalion of engineers until they reached their goal, and once again the lawyers were unsuccessful in calling a halt to our celebration.

The parade's personnel was the largest it has ever been; all the floats were protected by a good sized guard. The parade contained a band, St. Pat's regal hack, nine floats, four individual stunts, and a tractor. Triangle won first prize in the fraternity group with their huge effigy head labeled, "This is not the north end of a horse going south, it is a lawyer." Another outstanding float in the fraternity group was Kappa Eta Kappa's exhibition panning Hitler's annexation of Austria. Signs on the float read, "Going from Wurst to Wurst" and "From Paper Hanger to Border Trimmer." The American Society of Agricultural Engineers with their float marked, "Flash! Flash! On the Air With Your Campus Trash" won first place in the Engineering society group. "State Safety Drive," "State of Intoxication," and "Tom Drunkan's Drive" were signs on the second place A. S. C. E. float. First place in the individual class went to George Billings with his costume labeled, "The TVA." The themes of some of the other floats were "Rooney's Follies," "Madison Water" and the "Johnson Plan." Entries ranged from a tractor to a tandem bicycle.

After the parade ended a battle for the Blar-

(continued on page 139)



PRACTICE INTERVIEWS

Conducted By **MELVIN J. EVANS, m'13**

IN THE following interview I was trying to accomplish two definite objectives:

In the first case, I hoped to encourage Mr. Wandel to sell me on his ability to fill the position that he desired. I hoped that by asking him leading questions, he would assume the aggressive and tell me why he should be given the position.

Obviously an applicant can be so aggressive in an interview as to injure his chances, but within reason the interviewer appreciates an individual who will modestly but confidently present his qualifications.

Business appreciates a courageous personality and one who is aggressive within reasonable limits. The interviewer is continuously trying to size up the applicant from this standpoint. Anything that helps to give this impression is effective. Any applicant should have the particular phases of his experience that might be of interest thoroughly in hand so that they can be presented simply and intelligently upon request.

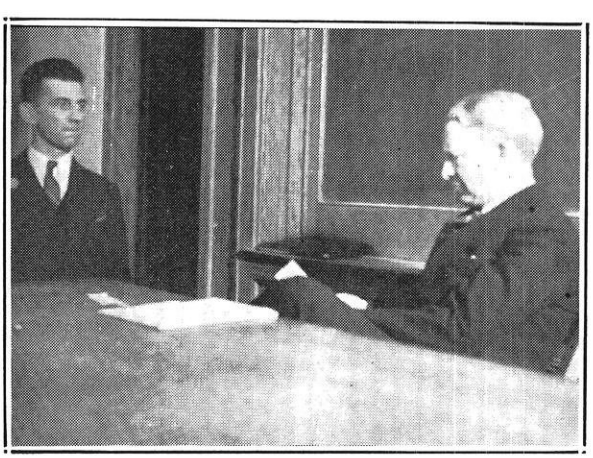
My next effort was to obtain information that would give me some idea as to the character of the applicant, his habits, etc. Here again I was hopeful that he would simply and plainly tell me enough about himself so that I might get a clear picture of his reliability, honesty, freedom from bad habits, etc.

The second individual, Mr. Block, presented his qualifications very effectively, inasmuch as they were organized in letter form. An interviewer always appreciates this assistance. He was also reasonably aggressive in showing his knowledge of industry.

We must always remember that the interviewer is primarily interested in his own industry and appreciates your interest in those things which are of importance to him.

In applying for a position we must remember that we have a selling job to do, namely, that of selling ourselves to someone we have never met before.

Briefly, we must be prepared to present our experience, our character, and our personality in a simple but forceful manner.



Mr. Evans Interviewing Mr. Block

RALPH WANDEL

Q. Mr. Wandel? How do you do, sir?

Q. I understand, Mr. Wandel, that you think you might be interested in a job with the Crane Company. Is that correct?

A. Yes, sir.

Q. Why would you like to work for the Crane Company?

A. I feel that there are a lot of chances with the Crane Company. It is a large corporation and I feel that a budding engineer—an engineer who is trying to get somewhere—would have a good chance there.

Q. What do you mean by "a chance"? If someone said that you could have any job you wanted with the Crane Company, what kind of a job would you like? What do you like to do? What are you best fitted for?

A. Well, I would like to get into executive work, possibly in the research field. I am interested in research work; that is, in discovering new things and in finding out about new things pertaining to the Crane Company in the research field.

Q. Well, that is a very interesting line but what makes you think that you would be a good investment for the Crane Company?

A. I have always tried to do things like that, I have always been very much interested in that sort of thing, and I feel that this interest will persist.

Q. Well, you have had several years in school and probably considerable outside experience. Is there anything you have accomplished along that line that you feel would benefit the Crane Company? What can you do that we ought to have in our business? I am not talking about big things, but are there any points in your own experience that makes you think you would be a bang-up research man? Do you think you are that?

A. Yes, I do.

Q. Why?

A. I had an opportunity to work in a machine shop where there was a gentleman who was interested in inventions; that is, he has some-

(continued on page 137)

AT THE CONVENTION

CHRISTOPHER A. WIEPKING of Milwaukee was elected president of the Engineering Society of Wisconsin for the coming year. Chris, who is now in charge of the testing lab for the Bureau of Streets in Milwaukee, was on the teaching staff of the department of mechanics at the University of Wisconsin for a number of years after his graduation in 1921. During his senior year in college he edited the Wisconsin Engineer. He is full of energy and ideas which will be needed in the society if it undertakes to carry out the policies suggested by the retiring president, Bob Johnson.

C. A. Wiepking

• • •

Clarence A. Willson, structural engineer with the state architect, was elected vice president. He, likewise, was at one time an instructor at the University of Wisconsin, in the department of structural engineering. He has been active in society affairs for several years and puts a lot of enthusiasm into the work.

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Bruno Hartman, of the Jerry Donohue Company at Sheboygan, and L. J. Markwardt, of the Forest Products Laboratory at Madison, were selected as new trustees.

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The registration was 155. This, however, does not represent the full number who attended the convention. There were many members present on Saturday morning who failed to register because of the breaking up of the convention into three groups located in three different buildings. As usual, there were many visitors, particularly student visitors. Chi Epsilon handled the registration as usual.

• • •

A feature of the banquet with the Technical Club was the presentation of honorary membership in the society to Dean F. E. Turneaure and Dr. Daniel W. Mead, both of Madison, in recognition of their long and brilliant services in the field of engineering and education.

• • •

The Forest Products Laboratory men put on a fine show on Friday afternoon in presenting the prefabricated house. L. J. Markwardt and R. F. Luxford, who have been active in developing the possibilities of prefabrication, each presented papers. Mark's colored movies of the erection of an experimental house at the Laboratory showed that the idea is feasible. Economical production, however, will require mass production.

• • •

A proposal for an Engineering Council, composed of representatives from all of the various engineering groups now existing in the state, was presented by President Robert C. Johnson, in his opening address, who pointed out the urgent need for some sort of organization to unite the 1,600 engineers now registered in Wisconsin.

Secretary Owen did his bit to keep the program on scheduled by providing a stop-and-go-sign which he had made by E. J. Romare, mechanician on the staff. It consisted of three lights, red, yellow, and green, which were placed on the speaker's table and operated by clockwork which was set by the presiding officer. It was effective in preventing a speaker from over-running his time. Its psychological merits have not, as yet, been established.

• • •

A locating engineer should put his highway where the scenery is, Mr. C. W. Lucas of the Michigan Highway Commission told the convention. Sixty per cent of motor car travel is for pleasure, he stated, and pleasure bent motorists like to look at scenery. Michigan is developing a shore-line highway 2,200 miles long that will be within sight of water for at least half of its length.

• • •

Sheboygan is getting so much gas from its sewage treatment plant, according to Jerry Donohue, that it is in a position to furnish power to the water works.

• • •

Milwaukee has brought its motor fatality rate down to 10.8 per 100,000 of population by a program of engineering, education, and enforcement, according to Howard Ilgner, superintendent of electric service for the city. Seventy-five per cent of the victims of traffic fatalities in Milwaukee are pedestrians. Effort has been concentrated upon the pedestrian. "Our aim," Mr. Ilgner said, "is to make the right and safe thing the easy thing to do."

• • •

Among the notables present at the convention was J. G. Staack, chief topographic engineer of the United States Geological Survey. Jack was raised on a farm near Middleton and received his engineering training at the University of Wisconsin. He spent more than one season chasing contours over Wisconsin hills and valleys for the U. S. G. S. His paper on aerial photography as developed for the use of the Survey indicated that the method is rapidly displacing the slower ground methods for many classes of work.

J. G. Slaack

• • •

A radical idea was presented by Mr. Herring, executive director of PWA, who suggested that young engineers would make better inspectors if they were given two weeks of special training before being tossed into the arena with hard-boiled contractors. He may have something there.

The Story of Stainless Steel

ALL stainless steels are made in electric arc furnaces (Fig. 1), most of which have a capacity of 30 tons. After melting, the molten steel is "tapped," drawn into a big container called a ladle, and poured into molds where it solidifies into ingots. When sufficiently cool the ingot is "stripped" from the mold and put into a pit where it is allowed to stand until it "soaks" up enough heat to reach a correct, uniform temperature for rolling.

Now, the ingot is rolled on a blooming mill (Fig. 2) into a slab, or a bloom, a long piece of steel with a cross-section roughly square. The slabs are later rolled down to flat plates, strips, or sheet bars. The blooms are rolled down into square or round billets which in turn are rolled into bars of various shapes and into tube rounds used for piercing in drawing seamless tubing.

The sheets are first hot-rolled, that is, the sheet bar is rolled into sheets while the metal is hot. Then the sheets are annealed or heat treated, depending upon the composition. Some form of heating is necessary because the rolling process hardens the metal, and it must be softened before it is suitable for further rolling or processing. "Annealing" is a form of heating which is used to relieve the internal pressures or "stresses" set up by rolling, thereby making it softer and more ductile.

The pickled sheet may be polished or cold-rolled. For cold rolling it is passed between the highly polished rolls of a four-high reversing mill (Fig. 9). This produces two finishes, called "2-B" and "2-D." For the latter the sheet is given another light anneal, followed by further light pickling. If unusually high tensile strength is desired, as, for example, in sheets to be used in building railroad cars, buses or trucks, the steel is rolled under much greater pressure in the four-high mill. The extra cold rolling in the mill greatly increases not only the tensile strength but the hardness of the metal.

With the completion of final operations, the sheets are crated for shipment. If they have been polished, they are interleaved with special paper to protect the surface of the metal from marring or scratching (Fig. 13).

The cold-rolled strip is rolled from hot-rolled strip in tandem four-high mills. One mill will roll strips up to 26 inches wide. Another has a capacity only up to 12 inches wide (Fig. 14).

The strip is cold-reduced to finished thicknesses and frequent annealing is necessary between rollings, particularly with 18-8 and its variations. Practically all of the annealing and pickling of stainless steel is now done in one continuous operation, with the metal slowly passing first through the annealing furnace and then through the pickling and rinsing baths (Figs. 15, 16, and 18).

High-tensile stainless steel strip is made by hard-rolling the metal in successive passes through the mill rolls. The rolling is supplemented by annealing at carefully calculated intervals. This process, which is confined to the 18-8 composition, gives the strip a tensile strength of 150,000 to 180,000 pounds per square inch, depending on the degree of reduction in cold rolling.

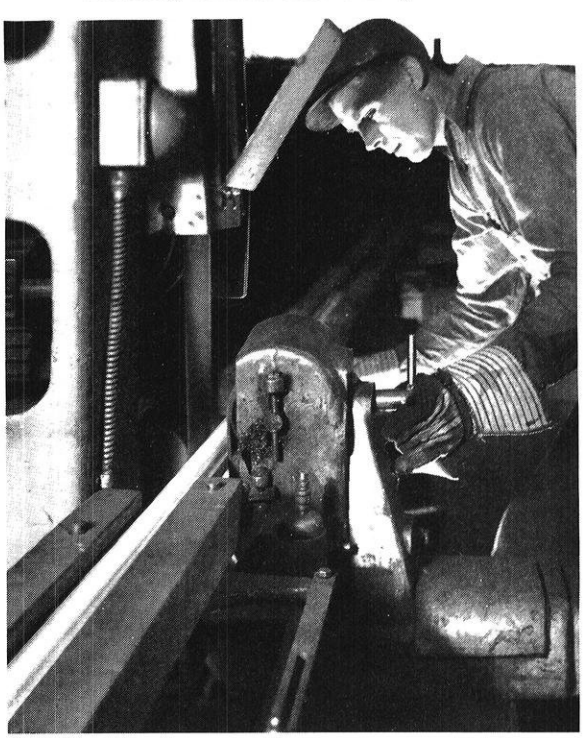
Cold drawing is adapted to the finishing of squares, hexagons and flats, as well as for round bars (Fig. 19). Rounds may also be straightened and finished in a "Medart" machine or in a centerless grinder (Figs. 20 and 21). The centerless grinder produces the highest finish, at the same time removing all surface imperfections.

Stainless steel wire, in various compositions, has many applications in the chemical industries and, besides, is used as welding electrodes or filler rods. The total amount of wire used for the latter purpose runs into considerable tonnage during the course of a year.

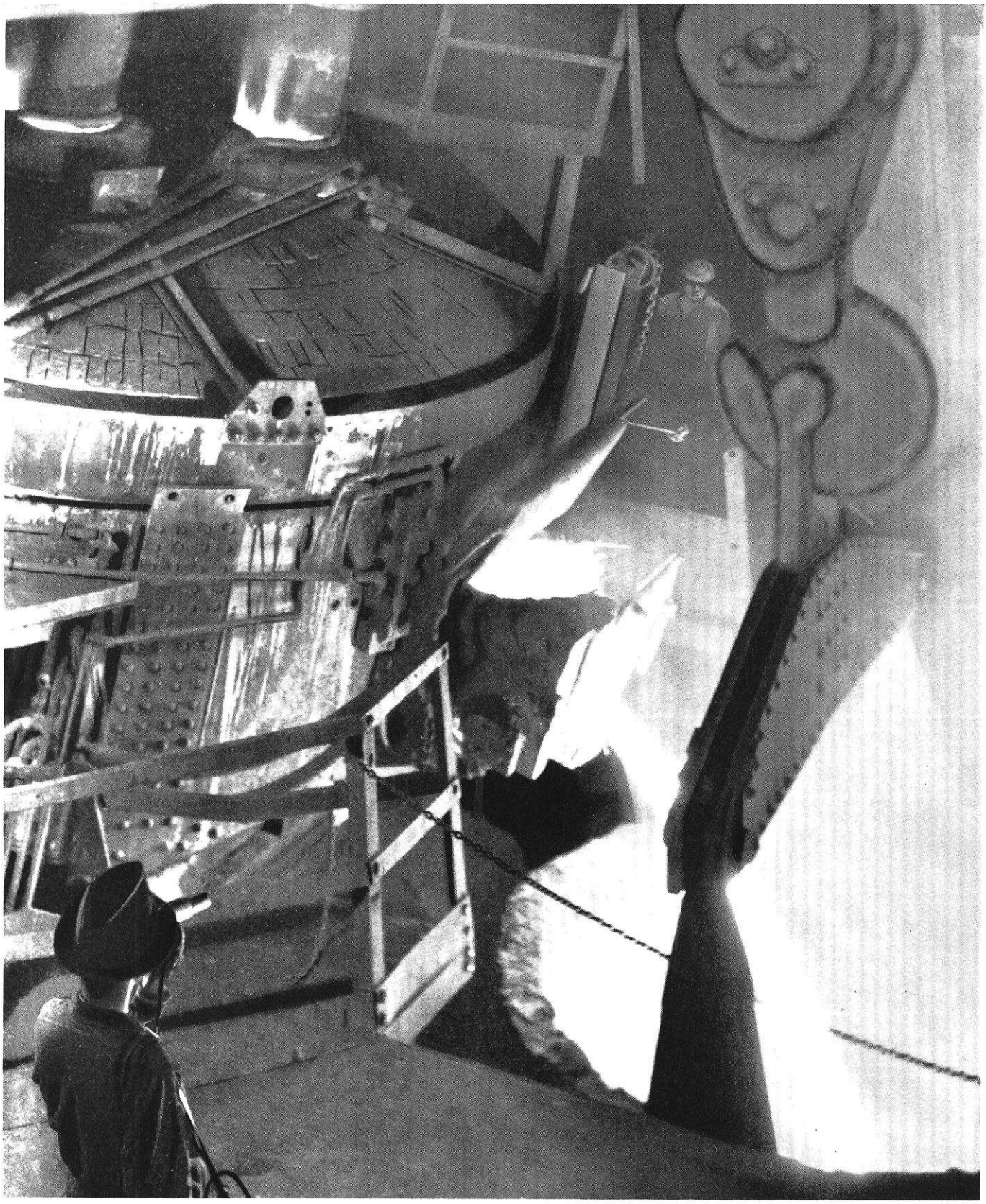
Very fine stainless steel wire, used for screens and filter cloth, is the finest wire drawn. In some cases, it is finer than human hair—wire with a diameter of 0.0019 inch being regularly produced (Fig. 22).

In the production of fine wire the final operation is to draw it through tungsten-carbide and diamond dies. Since annealing fine wire in the air would cause the surface to scale, annealing is done in an atmosphere of hydrogen which prevents formation of scale and leaves the wire as bright as when it came out of the die (Fig. 23).

Polishing Stainless Steel Tubing



Illustrations and captions by courtesy of US Steel News



THIS HOT METAL IS STAINLESS STEEL

Fig. 1. Tapping a heat of USS 18-8 stainless steel from a 30-ton Heroult electric furnace at South Works, Carnegie-Illinois Steel Corpn., Chicago. Note the observer checking the pouring temperature of the metal with an optical pyrometer.

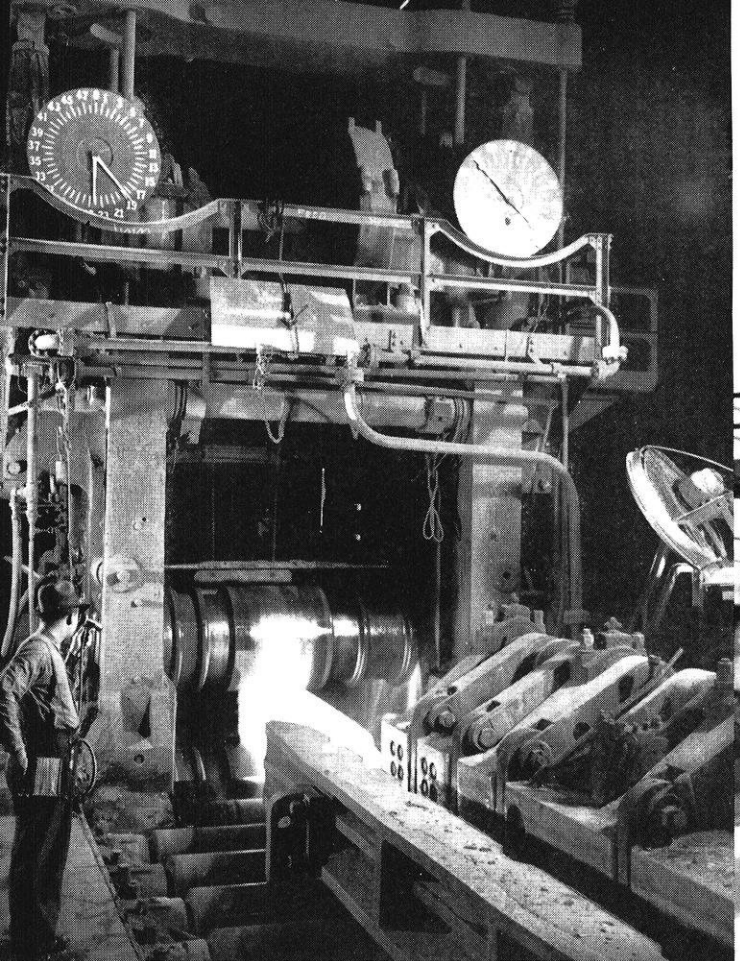


Fig. 2. (At left). Blooming mill at South Works, Carnegie-Illinois Steel Corpn. Here stainless steel ingots are rolled into blooms, billets or slabs for further processing. Notice another "brain truster" checking temperature with an optical pyrometer.

Fig. 3. (Below). Cooling bed of 96-in. continuous plate mill, South Works, Carnegie-Illinois, where stainless steel plates are rolled.

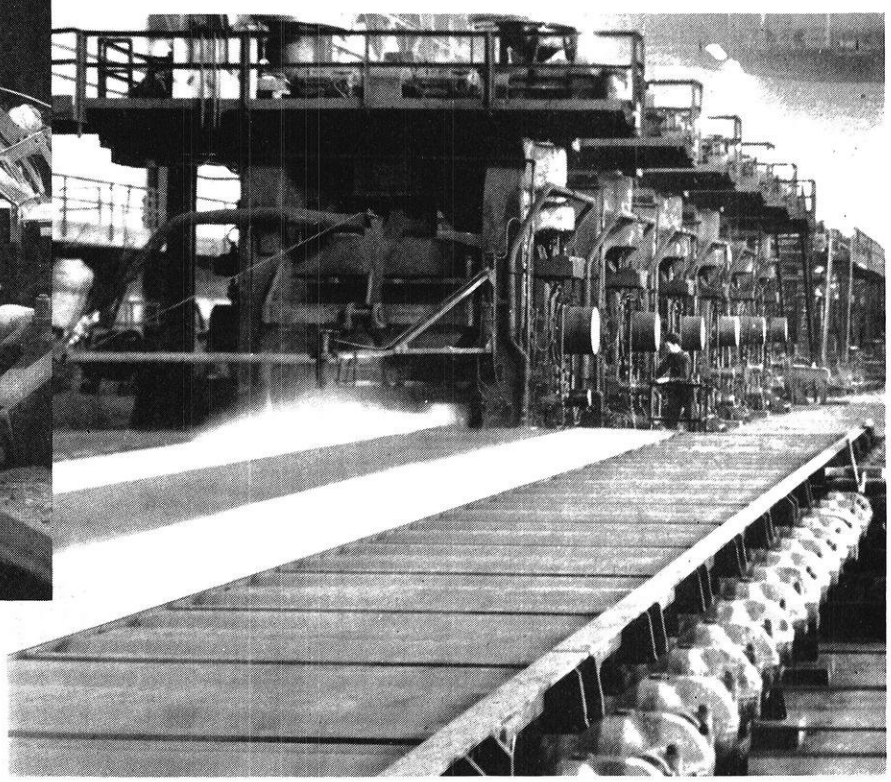


Fig. 4. (At left). Coils of hot-rolled stainless strip which will be further processed into cold-rolled strip or will be cut into breakdowns for rolling into sheets. The employee is putting a micrometer on the edges to see whether they are of the right thickness. This is called "inspecting for accuracy of gage." Gary Works, Carnegie-Illinois Steel Corpn., Gary, Ind.

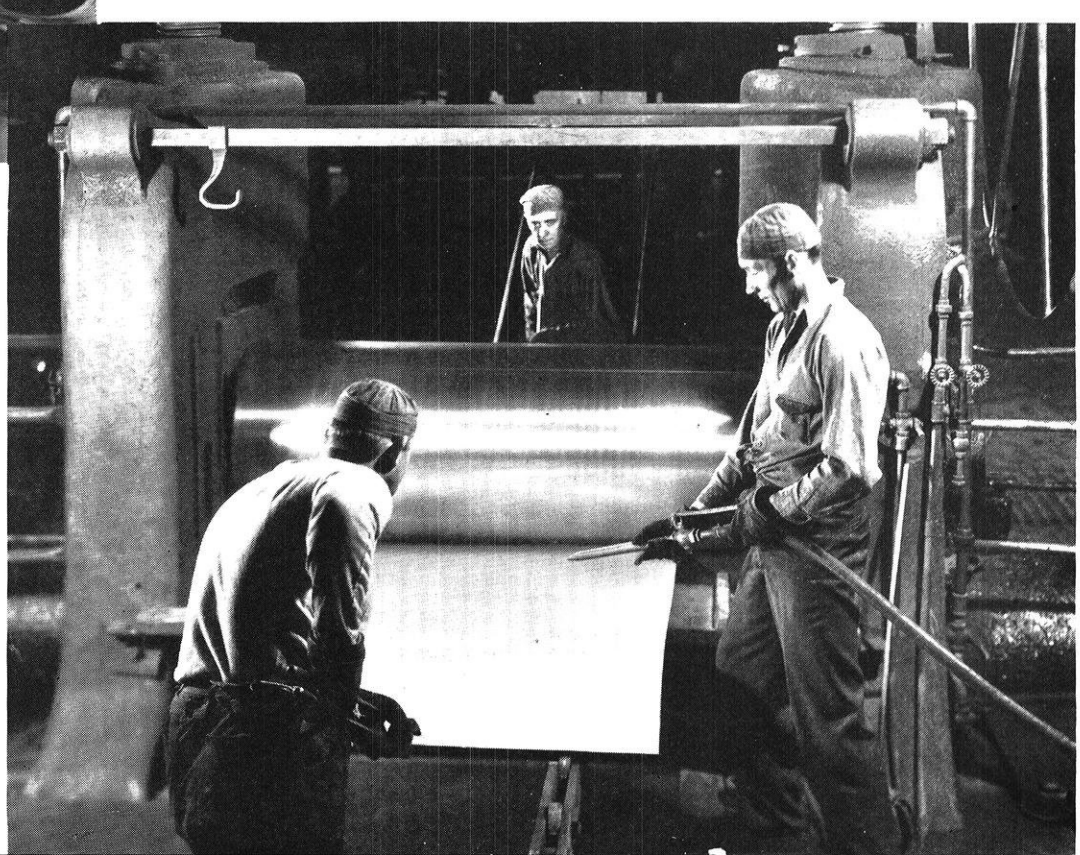


Fig. 5. (At right). Rolling stainless steel sheets at Wood Works, Carnegie-Illinois Steel Corpn., McKeesport, Pa. The man at the right is blowing compressed air on the sheet to remove any loose scale which may be present. It is important to keep the sheet free from such scale during rolling to prevent marking.

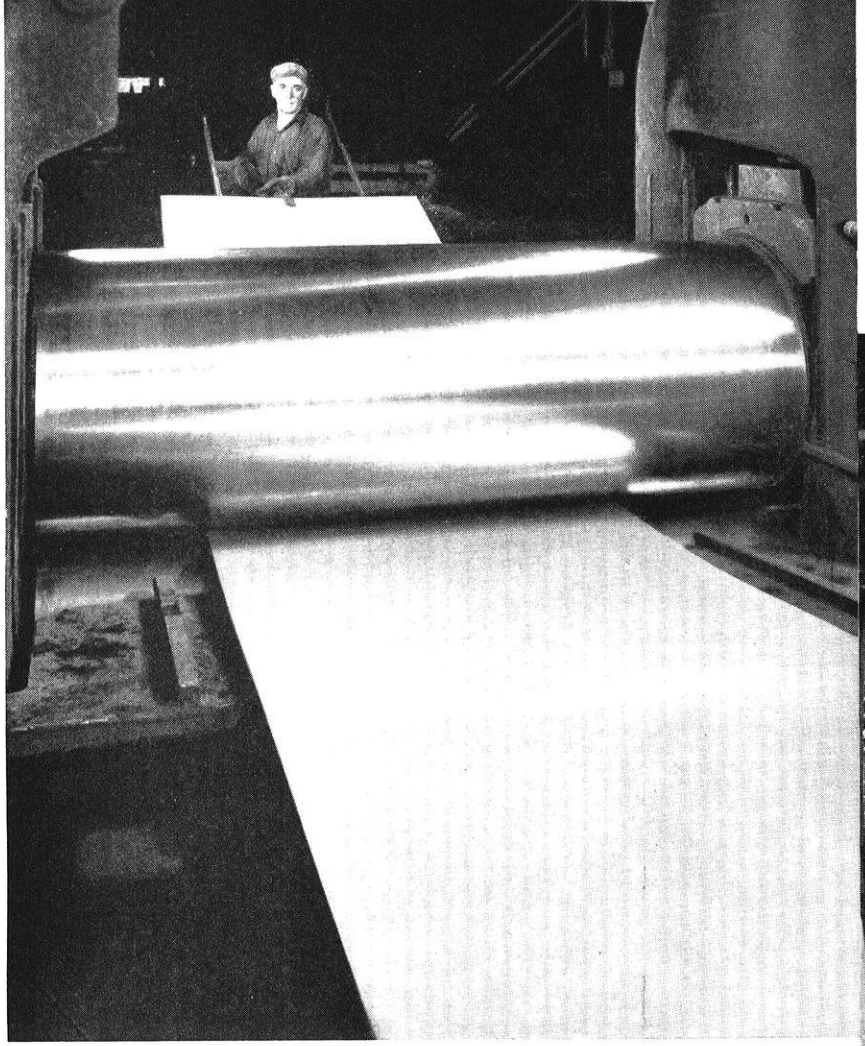


Fig. 6. (Above). Rolling stainless steel sheet at Wood Works, Carnegie-Illinois.

Fig. 7. (Below). Continuous annealing furnace, Wood Works, Carnegie-Illinois, in which stainless steel sheets are heat treated. The stainless sheet is laid on a "rider" or "waster" sheet for its ride through the furnace. The conveying mechanism is below the furnace except for the dogs (supports projecting from a continuous chain belt) which hold the sheets. The dogs project through slots in the furnace bottom. Note the two ventilating fans which help to keep the operator comfortable.

Fig. 8. (Below). These stainless steel sheets have just been pickled and are about to be immersed in a water tank to be washed and rinsed. Wood Works, Carnegie-Illinois Steel Corpn.

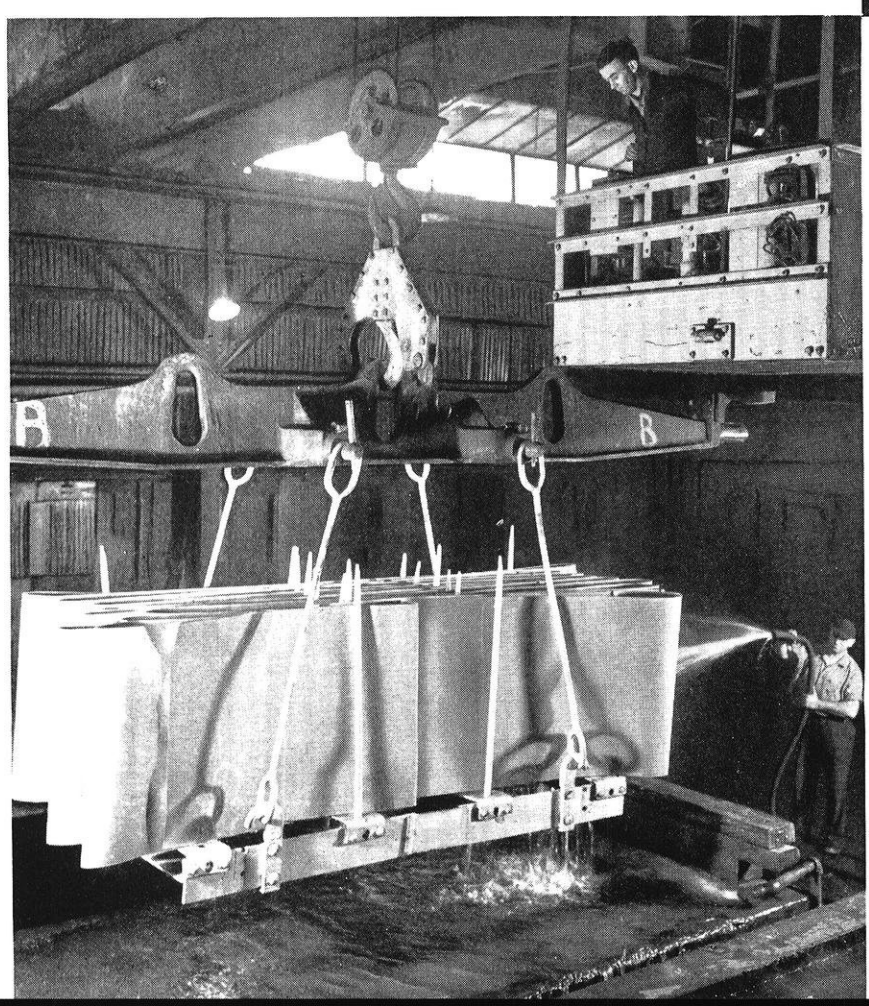
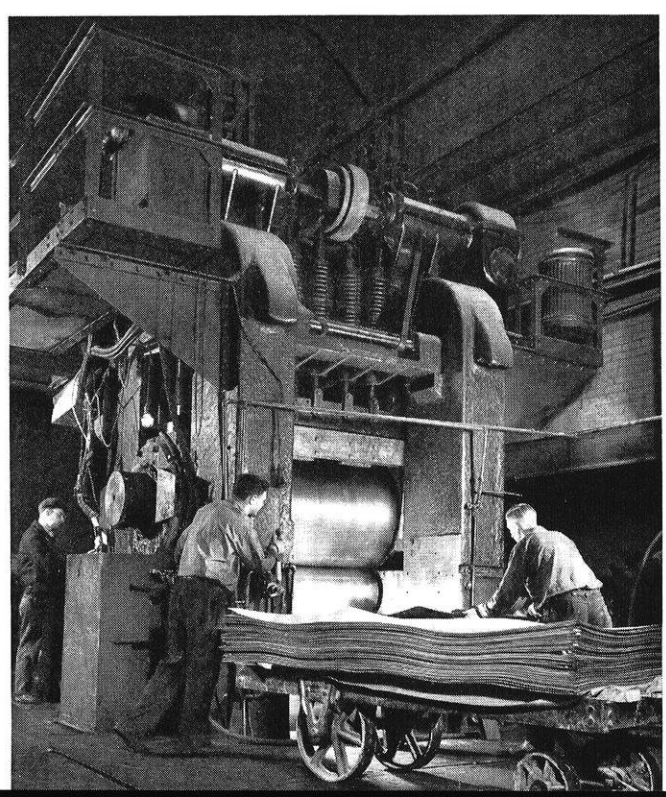


Fig. 9. (Below). Four-high mill where stainless steel is cold-rolled to produce a smooth surface finish or high tensile properties. Wood Works, Carnegie-Illinois Steel Corpn.



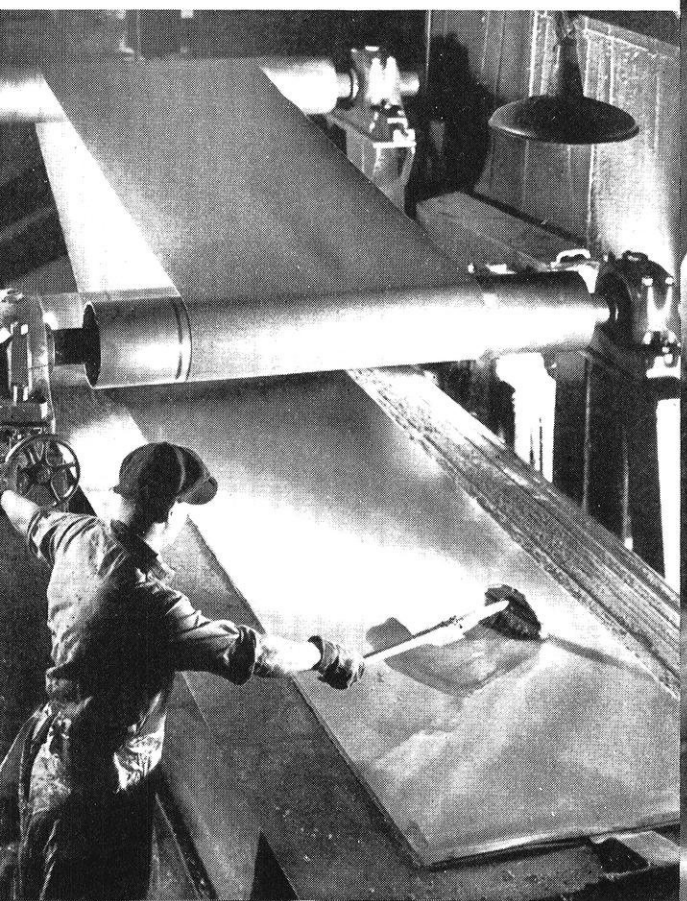
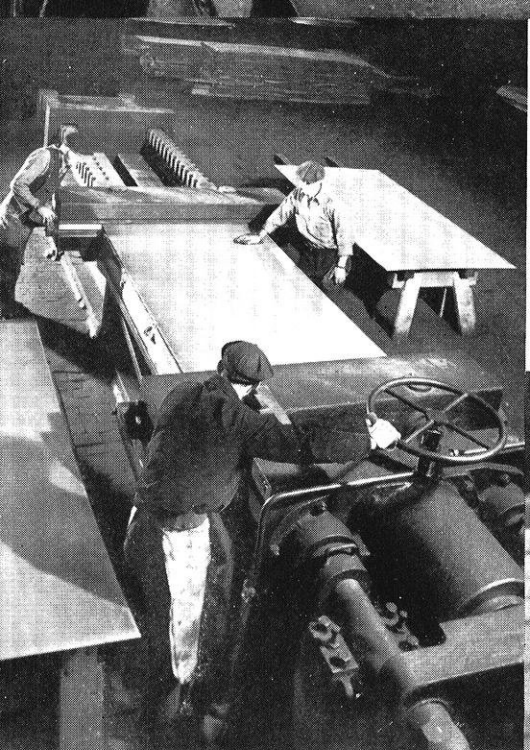


Fig. 10. (Upper left). Rough-grinding stainless steel, Wood Works. The operator is slushing grease on the sheet.

Fig. 11. (Above). Finish-grinding stainless steel sheets, Wood Works. The operator is applying a suitable grease.

Fig. 12. (Left). Hydraulic stretcher leveling machine, Wood Works. In this machine the stainless steel sheet is stretched just enough to produce a smooth and even surface.



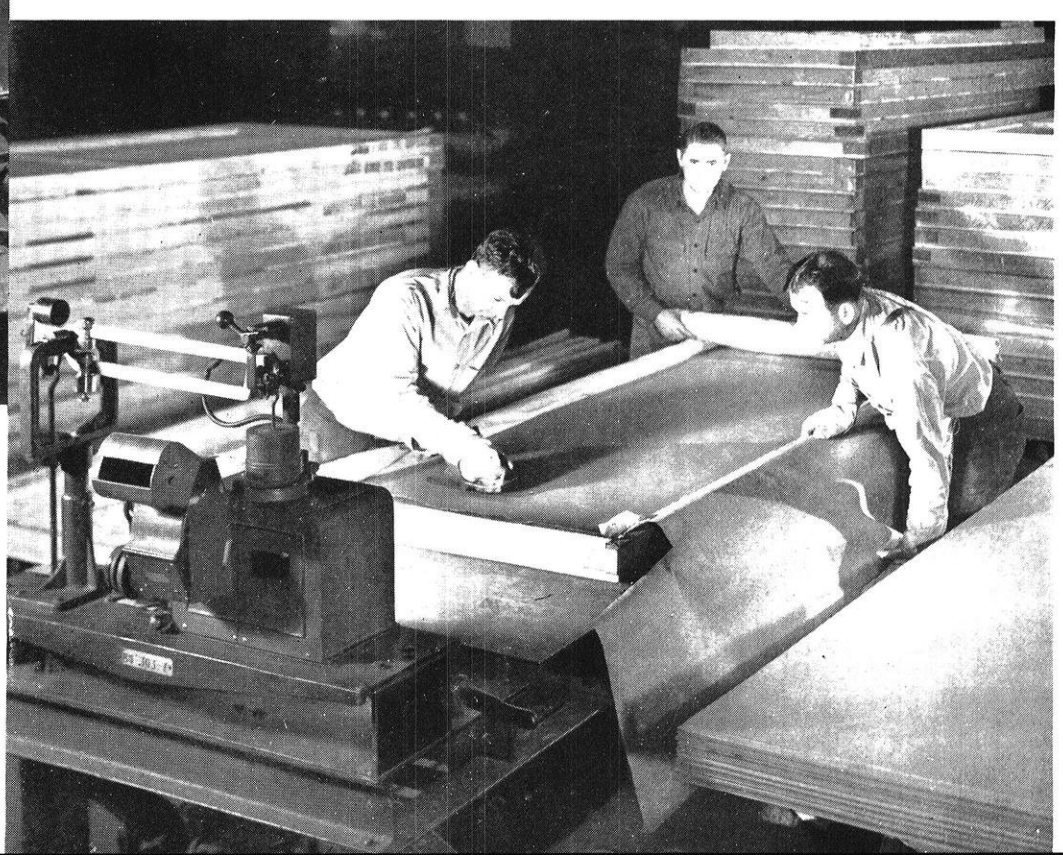
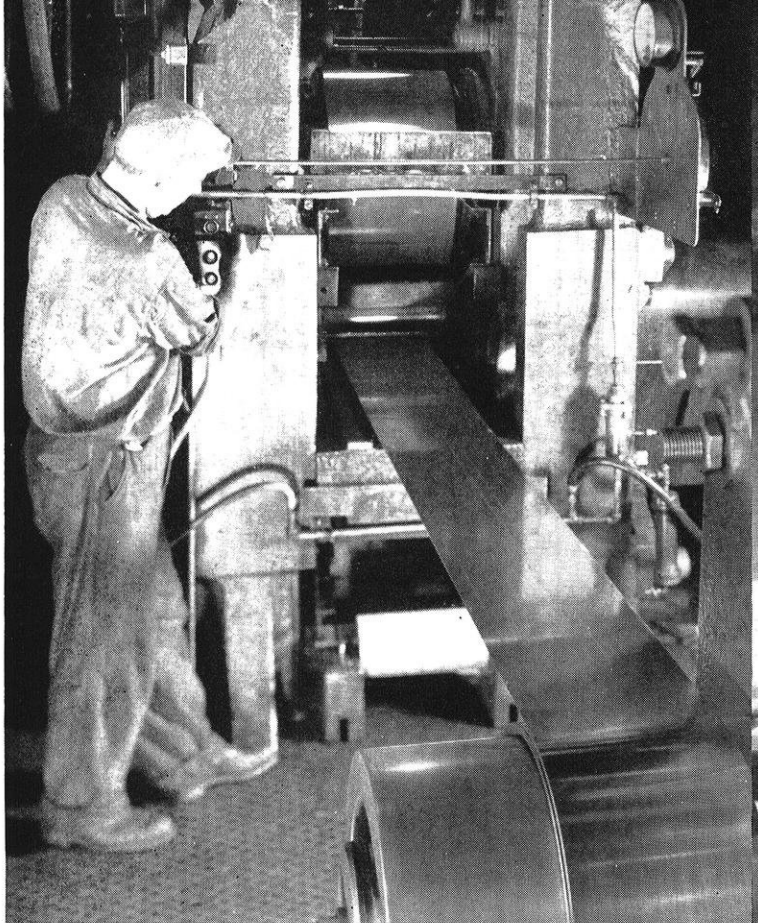


Fig. 13. (Right). Packing and crating stainless steel sheets, Wood Works. The polished sheets are interleaved with specially selected paper to prevent marring and scratching. The employee at the left is marking the sheet with a rubber stamp. Packing, inspecting and weighing are simultaneous operations here. The empty box and the paper are weighed first and the scale is set to tare. Hence when the box is packed the scale shows the net weight of the contents.



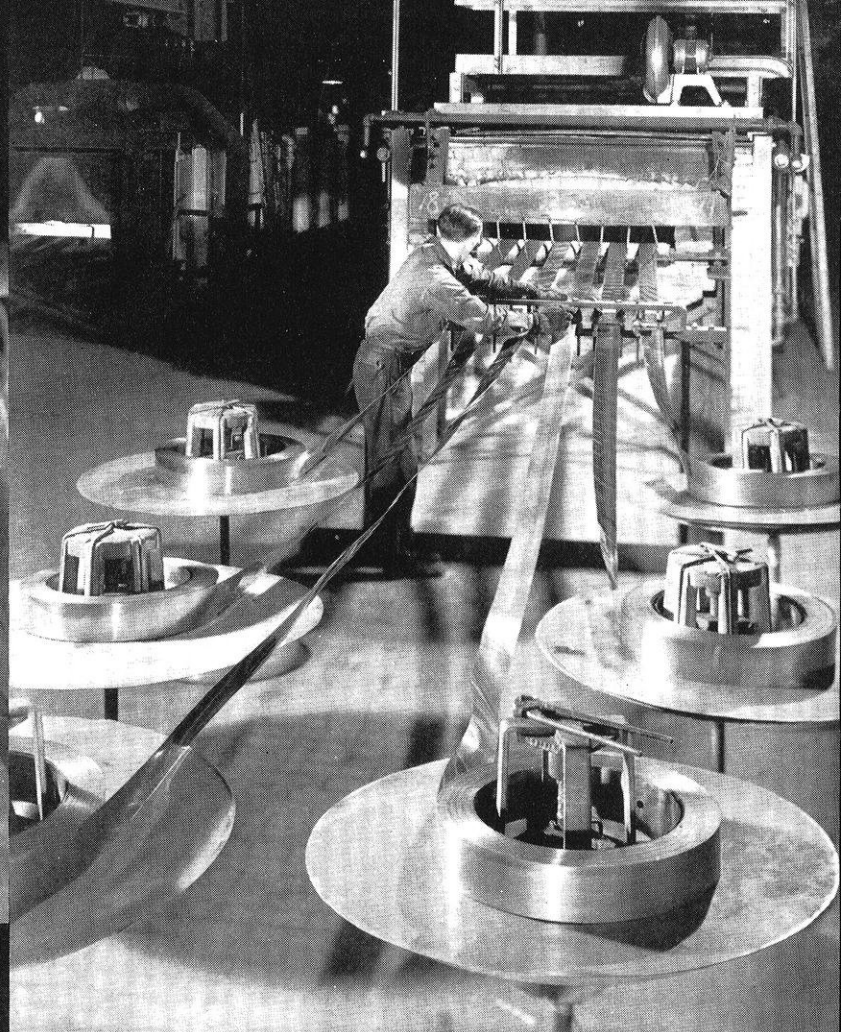


Fig. 14. (Upper left). Cold-rolled stainless strip leaving a 12-in. four-high cold-rolling mill at Cuyahoga Works, American Steel & Wire Co., Cleveland, Ohio.

Fig. 15. (Above). Cold-rolled stainless steel strip entering a continuous annealing furnace, Cuyahoga Works, American Steel & Wire Co., Cleveland.

Fig. 16. (Left). Continuous pickling of cold-rolled stainless strip after annealing, Cuyahoga Works.

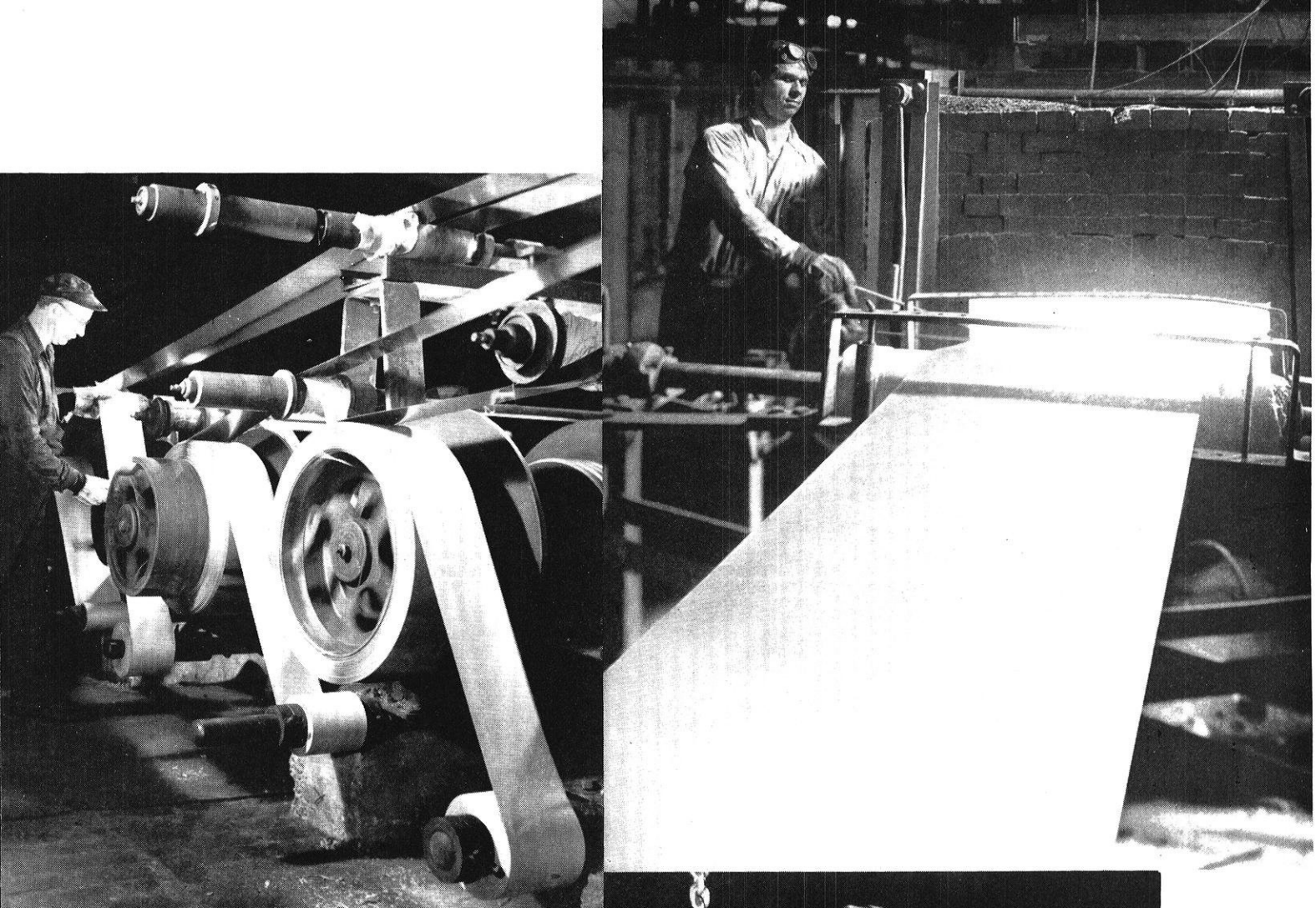


Fig. 17. (Above). Recoiling finished cold-rolled stainless steel strip preparatory to shipment, Cuyahoga Works. To protect the cold-rolled surface the strip is carefully interleaved with specially prepared paper. The paper, it will be noted, runs up from reels located near the floor.

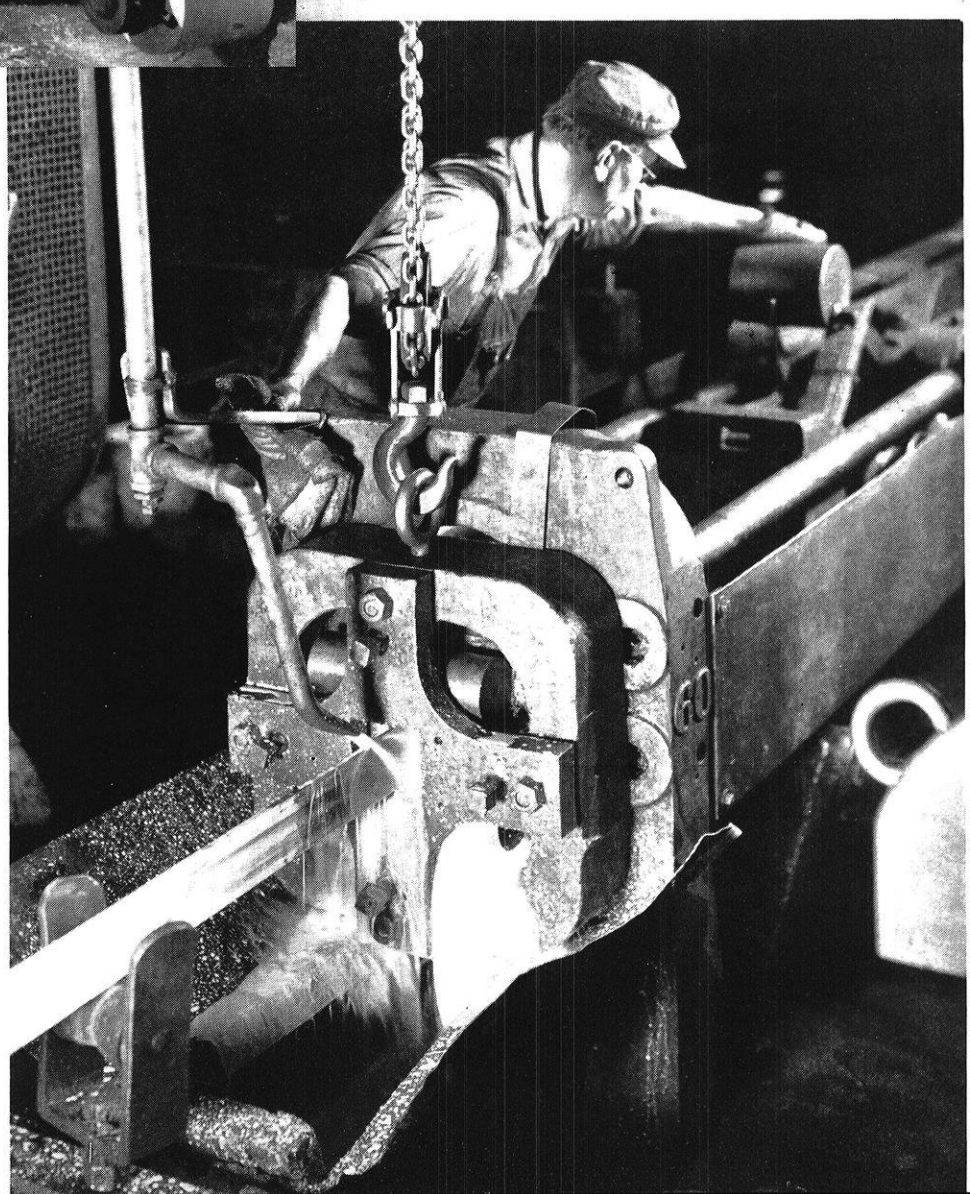


Fig. 18. (Upper right). Extra-width cold-rolled stainless steel strip leaving continuous annealing furnace, Cuyahoga Works.

Fig. 19. (Right). Cold-drawing stainless steel flats, Newburgh Works, American Steel & Wire Co., Cleveland.

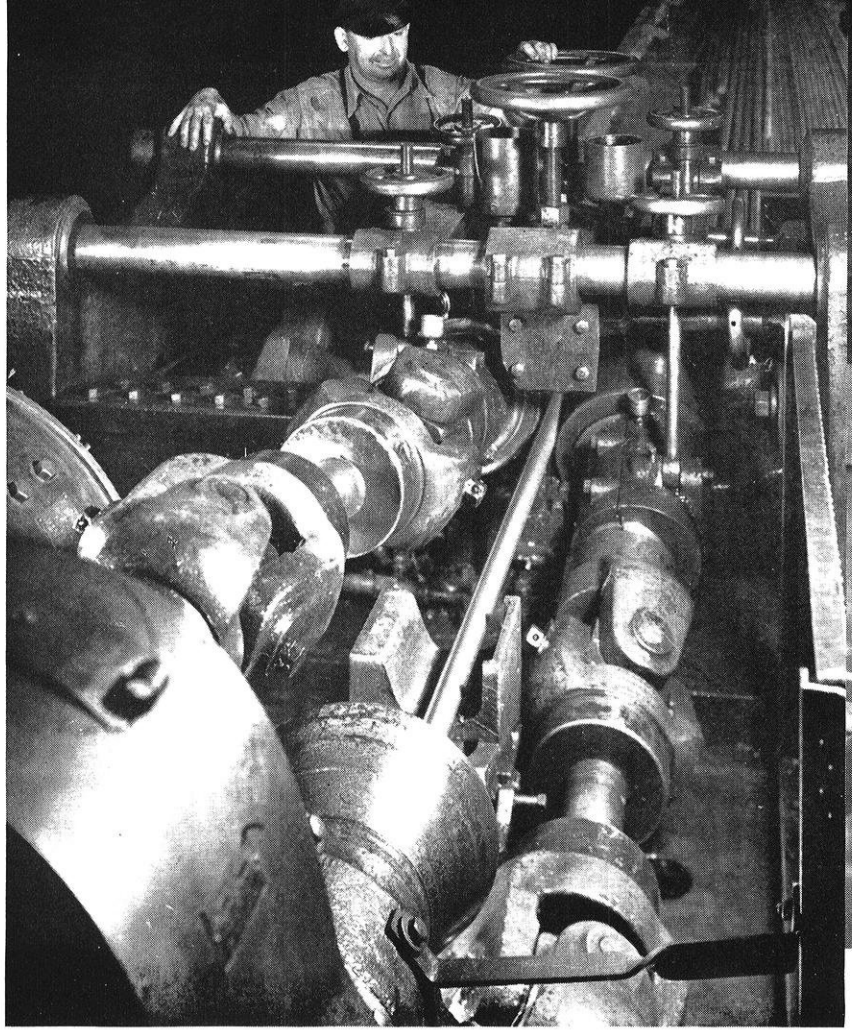
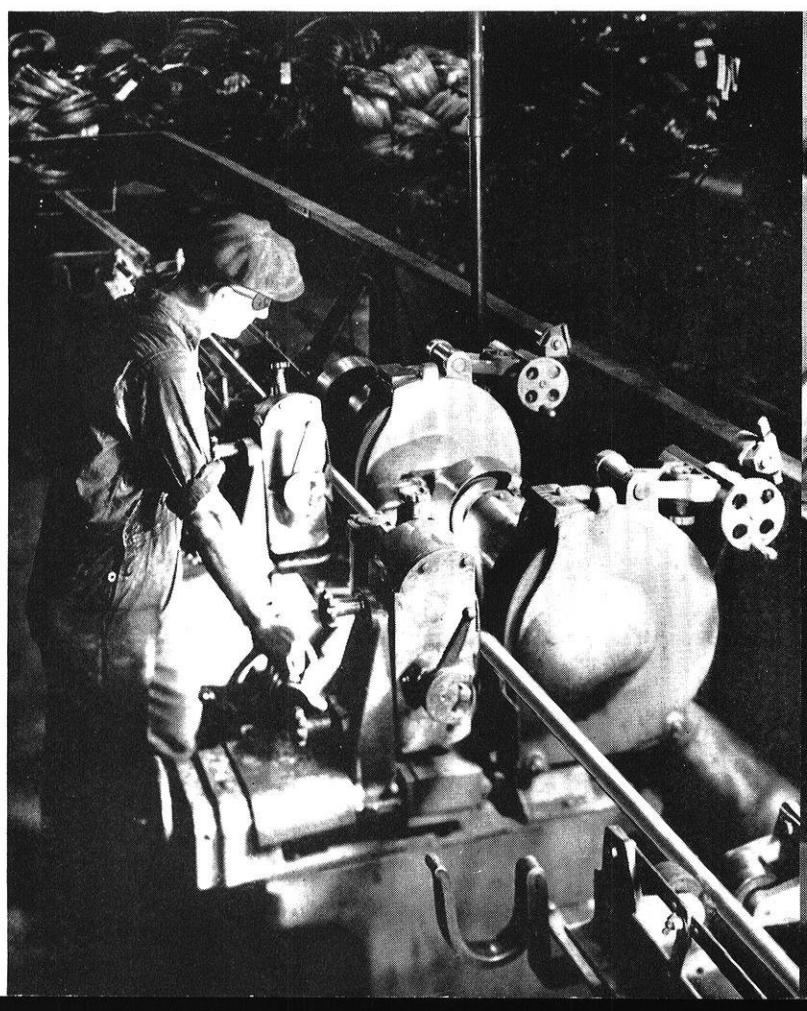


Fig. 20. (Above). Straightening and polishing stainless steel bars, Newburgh Works, American Steel & Wire Co.

Fig. 21. (Below). Polishing stainless steel bars in a centerless grinder. Newburgh Works.

Fig. 22 (Above). Drawing extremely fine stainless steel wire. American Works, American Steel & Wire Co., Cleveland.

Fig. 23. (Below). Annealing fine stainless steel wire, American Works.



The FROSH IN THE LIMELIGHT

Biggest Optimist

This month the prize for being the biggest optimist goes to a Freshman Engineer in a Math 52 class. He got a Math Quiz marked "55" back and just because it was April 1 he thought the instructor was joking.

•

Biggest Pessimist

Lester Massey, after hitting a 2.75 the first semester, refuses to predict anything better than "C's" for this semester. (We don't predict a 3. but we have an idea that Les is just a little modest occasionally.)

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Whoops! Now it all comes out. William Barck of Hoboken, N. J., didn't come all this way just for a little book learning. It seems that there was an added attraction in some young co-ed who influenced Bill to following the "setting sun."

•

An Absolute Cure

It seems that Mr. Bridge, instructor in mechanical practice, always bit his fingernails very short. Recently upon questioning him as to why he had suddenly given up his long pursued practice, he dejectedly stated that he traded his teeth for a set of store teeth and that he was having a pretty tough time of it.

•

Easter Vac

The boys are walking around with that far-away look in their eyes again. Going home is the Cry. Letters are being written at a feverish pace to insure a good time Easter, with the one and "How Many"?

Math Instructor: "HO is the projection of H on line OQ."

Voice (not unlike that of Charles Yerkes): "OQ kid."

•

Heard in an English class:

Instructor: "Wildeve was slipping rapidly. He had been an engineer; already he was an innkeeper . . . who could tell what he would be next?"

Snappy Retort: "He'd probably wind up a shyster."

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We're still wondering if Louis Kahlenberg was talking about a torch singer in his lecture on singing flames.

•

Believe It or Not

We have enrolled in the Freshman Engineering class such eminent personalities as, Robert E. Lee, Bobby Jones, and Woodrow Wilson. However, there isn't a John Smith in the entire school of engineering.

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FAMILIAR QUIRKS

No matter what you call them, they're still tests, and the engineers will be plagued with them as long as there is an instructor alive and kicking to give them. Some of the pet names for the lowly exam are Professor Kahlenburg's "field days," how we used to love 'em; Professor Hyland's "matinee," or "how to keep machine design from getting dull"; and last but not least Professor Kelso's "amateur hour."

The Solution

We had a long conference with Bascom Hall this afternoon and found out just what it saw when it looked past the Engineering building, but due to complications which would arise if these were known publicly we are b o u n d by our word to secrecy. We would suggest taking a look YOURSELF.

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Chem Lab

Jack Blum, an E.E., recently donned the role of Prince Charming in attempting to assist a female L. & S. student in securing a bit of something or other, in lab the other day. It seems the girl came walking into the Engineering lab to get some chemicals, and Jack wasn't one to be caught napping, nimbly jumping at the opportunity, he q u i c k l y proved his metal, much to the disgust of his higher minded (and slower moving) co-workers.

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Request

We will appreciate any n e w s which is sent to this column. (In fact, were in dire need of some new stuff.) So if you know of anybody who had his door taken off the hinges or any good classroom jokes, let us in on them. It doesn't seem possible that short sheeting is out entirely. And will somebody please do something to create news. All contributions may be addressed to "FRESHMAN PAGE" and deposited in the Engineer Box at the Main entrance of the Engineering building.

ALUNMI NOTES

Civils

LACHER, WALTER S., '07, has recently been appointed secretary of the American Railway Engineering Association with offices in Chicago. Until his appointment he was engineering editor of "Railway Age" and managing editor of "Railway Engineering and Maintenance."

HOWSON, LOUIS R., '08, member of the firm of Alvord, Burdick and Howson, has been appointed to the Illinois Board of Natural Resources and Conservation.

HUNTLEY, LEE H., '08, who directed construction on the recently completed Pickwick Dam on the Tennessee River for TVA, is now construction engineer on the Possum Kingdom Dam for the Brazos River Conservancy and Reclamation District.

CUTLER, JOSEPH A., '09, has been appointed to succeed Mr. H. W. Ellis as President of the Johnson Service Company, Milwaukee. Mr. Cutler served as an assistant under Professor Owen for three years following graduation, after which he started as a sales engineer with the Johnson Service Company. He worked up to the position of Manager of the Central District in 1923, and last year was elected Vice President.

RATHER, M. F., '13, who has been Manager of the Cleveland office of the Johnson Service Company for 20 years, has been made Manager of the Eastern District.

BARTLESON, GLENN S., '25, has been with the Pacific Flush Tank Company of Chicago since 1936.

TUTTLE, HAROLD S., '25, has been County Highway Commissioner of Vilas county since January of this year, with headquarters at Eagle River, Wis.

BAILLES, S. DUNCAN, '29, is with the Bureau of Air Commerce, 1204 New Post Office, Chicago.

TACKE, WALTER H., '30, is office engineer for the Bureau of Street Construction and Repairs at Milwaukee.

VILEN, FRANK I., '31, has been on the staff of the city engineer of Kenosha, Wis., since November, 1937.

TRESTER, HAROLD C., '35, has been chief of party on the Statewide Planning Survey since November, 1937.

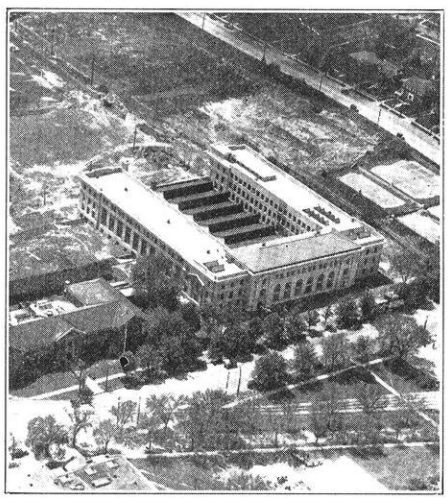
WERNER, MAX A., '35, is in Venezuela, where he is working for a contractor on the construction of buildings for the Gulf Oil Company. His address is, care of C. C. Ross, Mene Grande Oil Co., Apartado 234, Maracaibo, Venezuela.

Mechanicals

WARD, OSCAR G., 12, who has been in charge of the Denver, Colo., office of the Johnson Service Company of Milwaukee for the past 20 years, has recently been advanced to the position of Manager of the Central District.

CARSON, W. H., '23, M.E.'32, who has been with the University of Oklahoma for the past 12 years, where he was director of their school of petroleum engineering, has been made Dean of the College of Engineering at that university. Mr. Carson has taken an active part in many worthwhile projects of importance to the petroleum industry.

ZIEGLER, THEODORE F., '25, is employed in the Power Department of the E. I. Du Pont de Nemours Company, Wilmington, Del.



Mechanical Engineering Building

NAUJOKS, WALDEMAR, '26, is presenting a series of lectures on "Modern Forging Practice," sponsored by the Cleveland chapter of the American Society for Metals. Mr. Naujoks, Chief Engineer of the Steel Improvement and Forge Company, Cleveland, Ohio, is an authority on forging practice and design and at present is engaged in extensive writing activities.

MATSEN, MORRIS, '31, M.S.'32, is employed by the Du Pont Company at Wilmington, Del., doing work on cellophane and rayon.

LORENZ, GEORGE H., '32, formerly with the American Locomotive Company, Schenectady, N. Y., has accepted a position as design engineer with the Wisconsin Foundry and Machine Company, Madison.

KIRTLAND, EUGENE, '37, recently left the Perfex Radiator Company, Milwaukee, and is now engaged in sales engineering work with the Mueller Brass Company, also in Milwaukee.

MILUNOVICH, DAN, '37, who had been with the Perfex Radiator Company since graduation, has accepted a position with the Harnischfeger Corporation, Milwaukee.

WAKE, H. D., Feb.'38, is employed as an engineer with the Wisconsin-Michigan Power Company, stationed at Iron Mountain, Mich.

•

Chemicals

NELLER, R. K., '28, is superintendent of Mill No. 2 of the Kimberly-Clark Company at Niagara Falls, New York.

ZIMMERMAN, GORDON B., '31 holds the position of Supervising Chemist of the research and development laboratories, and for the pilot plant cracking unit for petroleum, Universal Oil Products Company, Riverside, Ill.

BRANDLHOFER, ALFRED, '32, was transferred from the South Charleston, W. Va., plant of Carbide and Carbon Chemicals to their Whiting, Ind., plant, where he is now Production Engineer.

LEA, WILLIAM, '32, is Superintendent of the Rio Loa plant of the Compania Sud America des Explosives, at Rio Loa, Chile.

COOK, GEORGE, '35, a former editor of the Wisconsin Engineer, is employed by Standard Oil Company of Louisiana at their Baton Rouge plant. At present he is engaged in the building of a pilot plant for the removal of asphalt and wax from lubricating oil by means of propane.

DAHLKE, EDWARD, '37, who is also employed by Standard Oil of Louisiana, recently spent a six week assignment at the Baton Rouge plant studying pilot plant construction.

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Electricals

NUESSE, ELMER C., 26, is employed in the valuation department of the Rochester Gas and Electric Corporation, with headquarters at Rochester, Minn. Previously he had been with the engineering department of the Wisconsin Public Service Commission for four and one-half years.

TANG, GENE KWONG, '35, is an assistant engineer for the China General Edison Company, Shanghai, China, engaged in the production of incandescent lamps.

Much has been said about the desirability of lower prices in the economic structure. It has always seemed to me that the Western Electric-Bell System relationship offers one interesting solution of this problem.

PRESIDENT

In the Public Interest

If a business did not need to seek or promote its market,

If its customers were fellow members in the same corporate system,

If their orders were consolidated so that economical production could be achieved,

Then—manufacturing could be conducted most efficiently and sales made without selling expense and without credit loss.

That exactly describes Western Electric's position in the Bell System, and the economies resulting from this arrangement are passed along to the telephone companies in the form of lower prices.

Thus Western Electric contributes its part in making Bell telephone service economical, and justifies its place in the Bell System as in the public interest.

Western Electric

BELL SYSTEM SERVICE

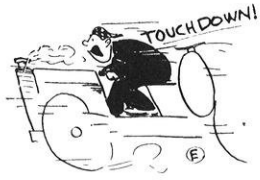
IS BASED ON

WESTERN ELECTRIC QUALITY

ON THE CAMPUS

IN MEMORIAM

It is with deep regret that we note the passing of a true friend on the engineering campus. Prof. Jim Dorrans has sold his Dodge, and never more will we see its familiar if battered countenance in front of the Mechanical Engineering building. It has served its time long and well and has passed on to a well earned reward. For twelve long years it faithfully served Mr. Dorrans, and (so he claims) never failed to bring him back under its own power. It is rumored that an effort was made to obtain it for exhibition in the steam and gas lab with the other equipment, but that it was frustrated by the dealer who claimed it on a trade-in.



APPLE POLISH

Gleaned from the column's many (all both of 'em) contributions was the fact that Pat Hyland is susceptible to bock beer and a good bull session. The unknown contributor suggests that it would be a dandy way to polish the apple with that hither-to unpolished gentleman. In reply, may we state that it has been done, but its effects are still to be seen. Rog Stanley, Harold Leviton, and several other senior mechanicals enjoyed a lively bull session in the Rathskellar recently with Pat and Professor McNaul. In fact, they were so engrossed in their talk that they were locked in the Union and had to dig up a janitor to let them out.

RAILROADS OF WISCONSIN

A detailed record of the laying and removing of railroad track in Wisconsin from 1827 to 1937 has been submitted as a thesis for the professional degree of Civil Engineer by James P. Kaysen '33, who is now in the signal department of the Milwaukee Road. This important historical record has already been published by the Railway and Locomotive Historical Society of Boston.

QUICKSAND

Recently there has been installed on the balcony of the materials laboratory a neat model to illustrate the fact that quicksand is the result of water flowing **upward** through sand. The model consists of a bridge pier with a section of roadway, resting in a bed of sand. There is provision for causing the water to flow either downward or upward through the sand. The operation can be carried out by an interested observer. Prof. Harold Janda suggested the idea, and the State Highway Commission made the model and donated it for the benefit of the students.

Don Blazer, junior mechanical, wins the rubber monkey wrench this month for the best wise crack. He popped his little gem of wisdom in steam and gas lab the other day when running a test on the ideal steam engine. Prof. G. C. Wilson asked him, "What would you do if we had the engine all set and then discovered upon starting it that it ran the wrong way?" Don replied, "Heck, that's easy. Just cross the belt!"

WORDS - WIRES - WAVES

On March 25, the electricals held another of their very interesting and popular meetings, featuring a lecture and demonstration by Dr. Owen Perrine of the American Telephone and Telegraph Company. It was held in Music Hall, and was attended by engineers of all kinds, music students, faculty, and representatives from nearly every other school on the campus. Dr. Perrine spoke of the problems confronting the communication engineer, and illustrated his talk with practical demonstrations. Mr. Westbrook in New York, Mr. Rogers in Tulsa, and Mr. Mutheeney at the Madison telephone exchange conversed with Dr. Perrine during the course of the program; and a parade marched up and down the street before the audience. And all within the limits of Music Hall.

PROFESSOR TALKS

Prof. Jim Watson has a class in E.E. comp. at 1:30. One day a few weeks ago he opened the two hour session with the statement that he had a minor point to clear up before the class went to work on their problems. Two hours later the bell rang with Mr. Watson still in the midst of the explanation of his minor point.

Mr. Watson had better warn the class ahead of time when he intends taking up a major point. They will want to bring their supper.

CASUALTY

Dean A. V. Millar was the major casualty of the annual Engineers' Parade on March 19. While viewing the riot on Langdon Street, he was caught in a swirl of running students and upset. A painfully swollen ankle kept him limping for some time.

Prefabricated Housing

(continued from page 127)

the cooler areas within the wall it may condense. Over extended periods considerable moisture may accumulate, the insulation may become wet, and its efficiency may be greatly reduced. Even when warm weather arrives the moisture disappears slowly and may make conditions favorable for rust, mold, and decay. Many paint problems, such as the peeling of outside paint, also arise from the accumulation of moisture within the walls. Obviously it is very important to prevent such conditions, and, therefore, moisture barriers have been used in the outside walls of this house.

The moisture barriers used consist of asphalt-impregnated and coated paper weighing 50 pounds per 500 square feet. The barriers are placed within the panel and against the back face of the inner walls, against the back of the upper face of the floor panels, and against the back of the lower face of the roof panels; that is, in all cases the moisture barriers are placed within the panels and against the back of the face nearest the inside of the room.

A moisture barrier is placed in each space between framing members, and consists of a single piece of paper so folded as to fit snugly against the plywood face and along the sides of the framing members. Those parts of the sides of framing members that are in contact with the moisture barriers were given a brush coating of asphalt paint just before the barrier was placed, after which the barriers were held to the framing members with wire staples at intervals of not more than 6 inches to keep the paper tightly against the framing members and in contact with the fresh asphalt paint.

The space within the wall panels is entirely filled with a mineral wool insulation giving a coefficient of heat transmission for the wall of approximately 0.13. This is superior to ordinary construction with ½-inch of blanket insulation.

In addition, the use of large plywood sheets in wall panels is very effective in making the structure wind tight. Insulation has also been placed in the partition walls for sound deadening purposes.

The floor panels are insulated with nominal 2-inch mineral wool bats and the roof panels with 4-inch bats.

Fire tests of plywood at the Forest Products Laboratory show that the plies of vegetable-glued plywood separate while burning, whereas the plies of resin-bonded plywood do not. Resin-bonded plywood will therefore give somewhat greater resistance to fire than will plywood glued with a vegetable glue. On this account, and also because it offers somewhat greater resistance to the passage of moisture, resin-bonded plywood was selected for the inside walls as well as the outside walls.

To obtain greater fire resistance a mineral wool of high density was selected as an insulating material.

The floor area of the house is 24 by 36 feet. The house includes a 12 by 20 foot living room, a kitchen, two bedrooms, a bath, connecting halls, and a utility room. In

(continued on page 137)

Prefabricated Housing

(continued from page 136)

addition there is a coat closet and a linen closet off the main hall, two closets in the larger bedroom, and a wardrobe closet in the smaller bedroom. Placed close to the house there is also a large garage, with a space at one end partitioned off for storage. The garage is connected to the house by a roof made of roof panels.

The walls of the living room are of natural finished birch, while the ceiling is painted a light color. The floors are of birch-faced plywood, as are all other floors, except the kitchen and utility room, which are of Douglas fir plywood. The walls of the hall are also of birch, finished natural. The walls of the other rooms are of Douglas fir, painted.

The house is heated with an oil burner. A warm air-forced circulation system is used, and the heating ducts are confined mostly to that portion of the hall connecting the various rooms. This portion of the hall has a lowered ceiling to accommodate the ducts. A post and plank foundation of creosoted wood has been used.

John W. Root of Holabird & Root, Chicago, was consulting architect, and the Goodwillie-Green Box Co., Rockford, Illinois, were the contractors.

In prefabricated houses there is a decided tendency toward one-story houses. It is, however, both practical and feasible to erect two-story houses with the Laboratory's prefabricated panel system.

Practice Interviews

(continued from page 129)

thing like 1,000 inventions behind him. I was very much interested in the type of work he was doing; that put momentum into my ambition. I realized it meant a lot of work but it increased my ambition and that is what makes me think that this field is just the thing for me.

Q. Let's forget the Crane Company for a few minutes. What do you like to do in your free time? Suppose I sent you to Chicago on a certain business matter and you had an afternoon to spend as you pleased. What would you do with your time? What do you like to do better than anything else?

A. There is one thing I enjoy greatly: I enjoy reading current scientific magazines; that is, anything new along that line.

Q. Just what do you mean by "anything new"? Have you any hobbies? What do you enjoy doing at home or here or anywhere else? Do you like to swim, walk or read fiction or detective stories?

A. I like to read the Saturday Evening Post or the Atlantic Monthly. I like to play golf, as far as sports are concerned; that is, away from industry. As I said, I like very much to read scientific magazines and to learn about things that have just come out and announcements of things that have been discovered in all fields of industry.

Q. One more question: When you tackle a job, can you give me any evidence that will show you like to stay with it? Or do you like to do a dozen different things at the same time?

A. Well, I have a tendency to do that, but I usually manage to stay with it. I have that fault but I have tried awfully hard and I think I have overcome it.

WILLIAM BLOCK

Q. Mr. Block? How do you do? Sit down, Mr. Block.

Q. You are applying for a job with the Globe Wernecke Company?

A. Yes, I am, and I have with me a letter of recommendation you may be interested in.

Q. This is interesting. You have had some experience with the Lloyd Manufacturing Company.

A. Yes, I worked for them two years ago.

Q. That should give you a good knowledge of the woodworking business.

A. I worked with woodworking machines, etc.

Q. In what part of the operations of the Globe Wernecke Company would you prefer to work?

A. I would like to get into their wood department in charge of operations, with the expectation of later becoming production manager.

Q. Of course you have had some experience in that respect. What do you think is the chief characteristic necessary or what should a man have to be a good production manager?

A. He must understand the operation of machines; also, he must be efficient in his relations with men.

Q. Do you feel that your work at the university or your work in school have enabled you to get along well with people in a shop?

A. I believe so. In my work and experience in factories I have been able to get along well with the men.

Q. In any of your work, have you ever had an opportunity to direct the work of a gang or crew of men?

A. Yes; I had one or two men working under me last summer in a construction gang.

Q. Do you feel that this experience was satisfactory? Did you have any trouble?

A. I think it was all right; I didn't have any trouble.

Q. Do you find it easy to get along with folks? In classes or in college, do you have any difficulty in getting along with people?

A. I have had no difficulty along that line.

"STATIC"

by **ENGIN EARS**

T's

I think that I shall never see
An auto like the Model-T;
A can whose three-inch tires are pressed
Against the earth's rough, stony breast;
A can who looks for gas all day,
And blows a radiator spray;
A crate that in the summer goes
And freezes up when first it snows;
A crank with which we often toil;
Four cylinders that eat up oil;
Poems are made by fools like we,
But only Ford can make a T.

•

The story is told of the Kentucky colonel who had an argument with the devil. The devil said that no one had a perfect memory. But the colonel maintained that there was an Indian on his plantation who never forgot anything. The colonel agreed to forfeit his soul to the devil if the Indian ever forgot anything.

The devil went up to the Indian and said, "Do you like eggs?"

The Indian replied, "Yes." The devil went away.

Twenty years later the colonel died. The devil thought, "Aha, here's my chance." He came back to earth and presented himself before the Indian. Raising his hand, he gave the tribal salutation, "How?"

Quick as a wink the Indian replied, "Fried."

—De Laval Monthly

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"Tsk-Tsk" Department

It makes us wonder what things are coming to when, out of six engineers arrested for excessive enthusiasm during the week of the parade, three of them, Mitchell, Walter, and Edelstein, turn out to be members of Tau Beta Pi. Or could it be classified as another "inspection trip"?

Says Alan Ross, speaking of the incident, "They sang the Prisoner's Song but they left out four bars and the prisoner escaped."

•

Bill Kommers in Mechanics 3: "When her I beams on me why cantilever?' '

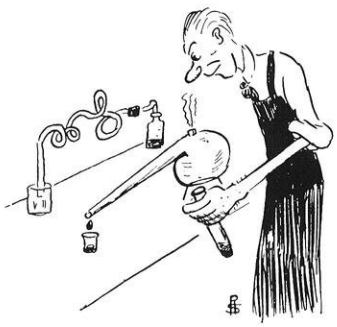
•

After taking part in the St. Pat's week goings-on, it occurs to us to wonder how the two words "law" and "order" ever happened to get hooked up together in one expression.

Contribution:

Age-hardening has been proven a worthwhile process in improving the physical properties of certain alloys. Using the same principle, Frank Bemis sought to age-harden some cider.

The half jug of apple juice was allowed to rest for a couple of weeks, during which time the small animal life therein generated the transformation leading to increased hardness. The experiment was doomed to failure by continued losses in the jug's contents. The fellows wondered how the stuff tasted. Eikelberg offered his opinion that it was probably "q u i t e yeasty." When he was quizzed as to how he knew so much, "Ike" mumbled something about making the stuff up home in the wilds of the Reeseville hill country.



When the working fluid had diminished to but a few CC's, Frank decided to find out where the cider went. Did the yeast destroy their own environment? Or did Eikelberg———???

Working on the theory that yeast are not "insectivorous," Frank definitely proved his theory. On Thursday there were three flies in the jug; on Friday there was only one.

•

More interest than that felt by most students was displayed by a dog which wandered into Professor Owen's T. E. 104 class the other day, hopped up to the blackboard and paid flattering attention before taking his leave and seeking knowledge elsewhere.

•

Wonder when they'll get around to washing off the chickens with which the windows of the Engineer office were bombarded the Friday night of the dance when a handful of engineers held off a mob of lawyers outnumbering them ten to one by drenching them with fire hoses from the Engineer windows. And, speaking of chickens, we heard Johnny Woy telling about someone who was

hit on the shoulder with an egg in the parade. He reached up to brush it off and it walked off.

•

"What have you done?" Saint Peter asked,
"That I should admit you here?"
"I edited a joke page," I gravely said,
"Of my college for one long year."
Saint Peter pityingly shook his head
And quietly touched the bell.
"Come in, poor thing, select a harp.
You've had your share of hell."

—Pennsylvania Triangle

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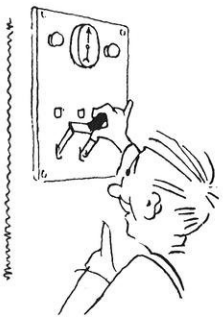


The newest research project in the E. E. department is Jerome Frank's experiment on DC-operated auto-transformers, performed in Mr. Price's section a couple of weeks ago. Whether or not Mr. Frank has been able to resolve the results into symmetrical phase components or not, we don't know.

Engineer's Parade

(continued from page 128)

ney Stone ensued and several lawyers had to be rolled in a mud puddle before they knew enough to behave themselves. One Swede Jensen got so out of order during the Blarney Stone ceremonies that the "Royal Guard" decided that his punishment should be the removal of his pants.

When the battle ended on the lower campus the lawyers commenced a raid on the Engineering building, a raid which resulted in broken glass, dumped waste baskets, and about six inches of water on the lower hall floor. The engineers fought off several lawyer attacks by the fire hose method, and then both sides mutually agreed to drop the matter for another year.

Engineers proceeded to clean up their building, spectators wandered on toward their homes, the city firemen got out their hoses to flush off the streets, and the sun sank deeper in the West.

A beautiful and successful afternoon came to an end.

EDITORIALS

ENGINEERING COLLEGE MAGAZINES ASSOCIATED

Perhaps you have wondered just what the line, Member, Engineering College Magazines, Associated, on the front cover of each issue of the "Wisconsin Engineer" means. What purpose does this society of college magazines fulfill? Who belongs to the group?

"If a man empties his purse into his head, no man can take it away from him. An investment in knowledge always pays the best interest."

—FRANKLIN

The E. C. M. A. is an association of established magazines, one of whose principal objects is to make the engineering college journal a more attractive advertising medium to national advertisers. It was founded in 1920 with this purpose in mind, and to help the member magazines improve their editorial quality and general make-up. Since the time of its founding, the E. C. M. A. has grown steadily until now it includes 24 college magazines.

By organizing this society, requiring the member magazines to publish journals of uniform sizes and to come up to certain standards, the problem of soliciting national advertising became a much simpler one. Through the efforts of the E. C. M. A. all of our national advertising is obtained, and this indeed provides a sizable share of our income which makes it possible for us to put out a better and more interesting magazine.

Then the question arises, why do these large companies advertise? What benefits are derived from soliciting engineering students who as yet have nothing to do with business? The answer is that they are soliciting good will which will pay dividends in the future. You and I are the ones that in the years to come will be dealing with these companies. We are the purchasing agents who will be buying their goods, or we may be selling goods to them; in any event it is then that their present investment in advertising with the college magazines will pay dividends. For through their continued advertising we have a knowledge of their functions, of their personnel, and of the services they perform to the people of the world. All of this background of these companies will not be forgotten by the students who are the important men of tomorrow.

These then are the purposes and functions of the E. C. M. A., and the motives underlying the national advertising in engineering college magazines. It is our hope that the E. C. M. A. will grow, and that more companies will come to see the benefits derived from advertising in our magazines. That more concerns will make an investment in the good will of the future industrialists.

WHY A COLLEGE EDUCATION

We all have some very definite reason for coming to college. Some come to study a technical subject, others to increase their future earning power, and still others to study economics, the languages, or to prepare for the professions. Yet when the education is completed, what benefits have we obtained? This question is answered by Mr. Chaplin Tyler of the du Pont Company.

"What benefits are derived from a college education, particularly an education in engineering or science? This question has been discussed by educators and by employers, and they have found that college men as a group attain comparative success as measured by such standards as earning power, mention in 'Who's Who in America,' or distinction in business, politics, and the professions. Such critera, however, indicate only the over-all result, not the reasons for attaining it. If we have the reasons, we have a valuable key.

"Several years ago, a dozen college graduates, out of school 15 years, met with their former instructor and asked themselves what was the most valuable thing gained from college. In the group were practicing engineers, executives, bankers, and merchants, no two engaged in the same branch of industry, but all having graduated from the same course. They concluded that college education had provided a working philosophy that far outweighed the value of any specific course of study. Of first importance in this philosophy came an unswerving faith in cold facts—'a humility before truth.' Second came 'logical deduction,' the habitual skillful wielding of facts in reaching a conclusion or decision. The third element was a 'sense of stewardship' or responsibility regarding the job."

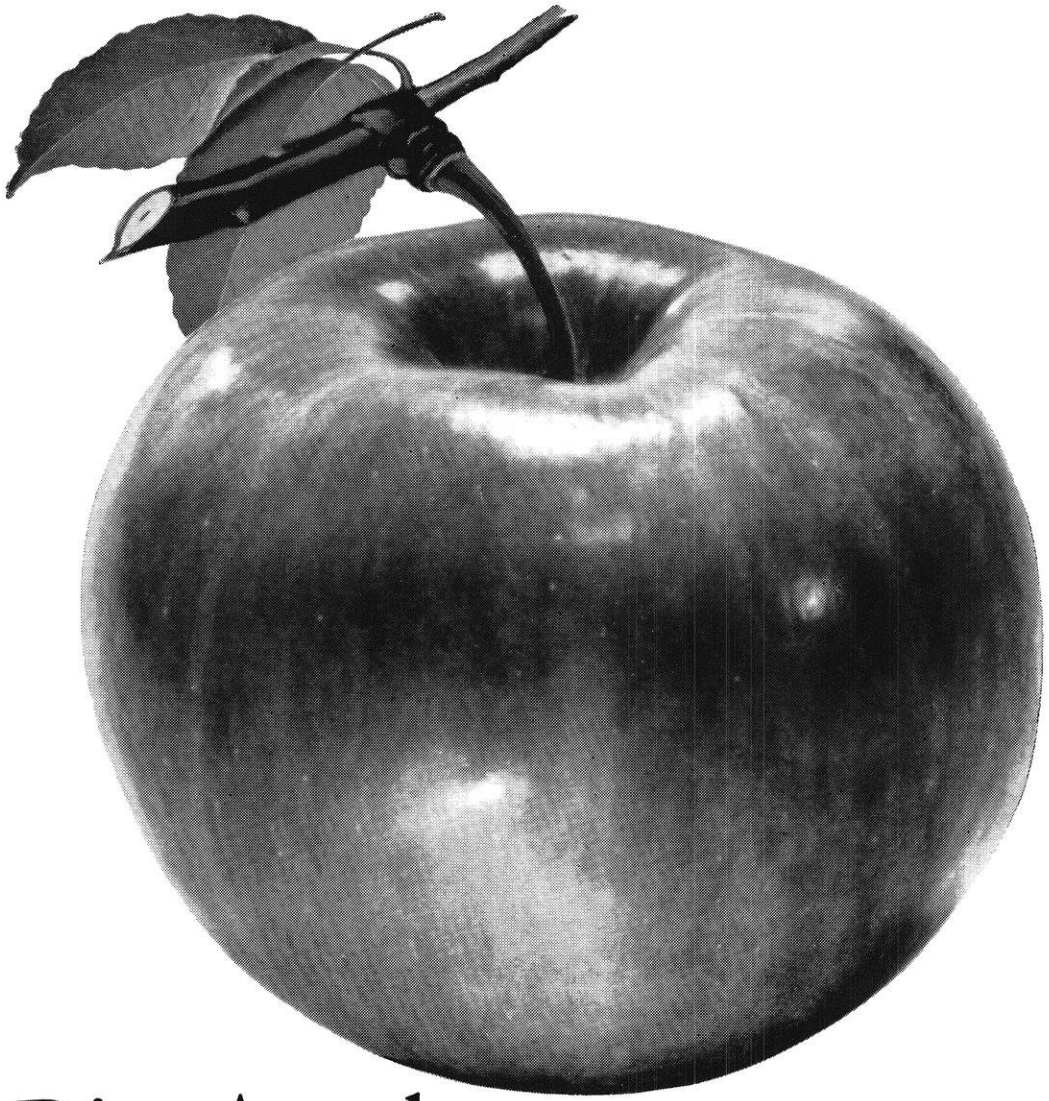
Possibly after hearing what these men felt to be the results of an education such as we are in progress of receiving, we can pattern our college careers to better obtain these same results.

ELECTIONS: The elections are all over. All of the ballyhoo, campaign promises, and excitement are gone; the new members of the campus boards have been chosen. The number of ballots cast was as large as it has been for some time. This is indeed a promising sign for it indicates a rising interest in student affairs.

However, now that the elections are over, let's not forget all about the candidates that have been elected. Let's make it a point to see these men, ask them questions about their particular positions and see that their campaign promises are carried out.

This year has seen the rise and fall of the Johnson Plan, a proposed form of student government that would give better representation to all students. The plan failed to go through, but much interest was aroused by it. Possibly this interest was responsible for the large turnout at the polls during Spring elections. But this interest should not end with the actual elections; it should be the beginning of it.

The members of these boards are only too willing to hear suggestions, to discuss and carry out new ideas, for they are your elected representatives. Through them your interest in student affairs can be continued to the benefit of all.



THE Big Apple

TO YOUNG AMERICA, the Big Apple may be today's dance sensation; but to some 150,000 commercial apple growers it is a product for profit.

This business of raising the nation's apple crop, like all other commercial enterprises, presents its difficulties. Foremost is the constant fight the orchardist must wage against insects and disease.

Only a healthy, unharmed apple can be a Big Apple. And it requires only the simplest arithmetical calculation to realize that more big apples make more bushels —and more bushels per tree make more profit per season.

Hence, the apple grower is eager for effective materials to defeat such crop destroyers as rosy apple aphis, early green aphis, San José scale, scurfy scale, bud moth, European red mite, apple scab and similar infestations.

Not only must the fruit itself be safeguarded but, equally, the foliage. For, it is commonly known that the fruit flourishes in direct proportion to the healthy substance of the leaves.

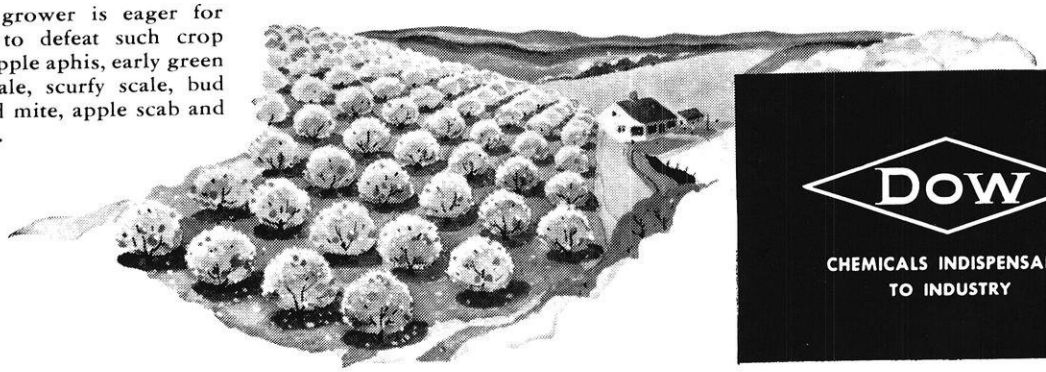
Thus, profitable apple growing calls for seven to twelve sprayings each year to fully protect fruit and foliage against insect and disease infestations.

Widely used for these protective sprayings are Dowspray Dormant and Dow "Mike" Sulfur. The former, applied during the dormant period, destroys the aphis egg and is effective against more insects than any other dormant spray now available. The latter, used during the growing season, is a superior wettable sulfur and provides a high degree of protection against apple scab and other fungous growths.

Through these, and many other insecticides and fungicides, Dow is serving the fruit grower that he may produce larger, finer crops and enjoy a greater reward for his efforts.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

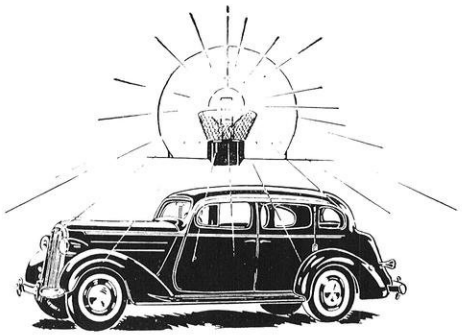
Branch Sales Offices: 30 Rockefeller Plaza, New York City—Second and Madison Streets, St. Louis —Field Building, Chicago—584 Mission Street, San Francisco—2260 East 15th Street, Los Angeles



DOW

CHEMICALS INDISPENSABLE TO INDUSTRY

G-E *Campus News*



18 INCHES OF SUNLIGHT

A 50,000-WATT General Electric MAZDA lamp, a foot and a half in diameter, was recently installed in the Styling Section of the General Motors Corporation at Detroit. This lamp, the first of its size to be used commercially, is utilized to simulate sunlight on automobiles on display. Previous lighting not only was inadequate, but produced distracting reflections on the car bodies.

By means of a G-E thyratron reactor control similar to devices used to dim lights in many large theaters, the light from the lamp can be varied from full brilliance to a black-out.

Many such practical applications as this are the culmination of group effort. That is why General Electric Test men of today and yesterday are always to be found contributing their part to General Electric's progress.

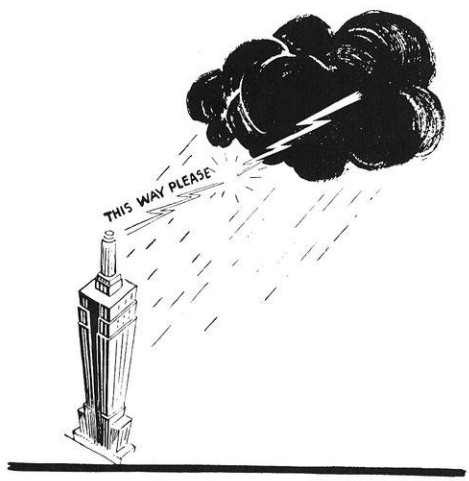
FOR OUTSTANDING ACHIEVEMENT

EACH year General Electric honors those employees who have done outstanding work in their fields as provided in the Charles A. Coffin Foundation. This year 40 men were chosen—15 of them college graduates:

Adelbert Alexay, Polytechnic Institute of Budapest, '11; *Alexander Babillis, Rose Polytechnic Institute, '28; *T. M. Berry, Kansas State College, '27; Michael Broverman, Tri-State College, '22; F. E. Carlson, University of Michigan, '25; *S. B. Crary, Michigan State College, '27; R. E. Farnham, Case School of Applied Science, '17; J. W. Gilchrest, Cooper Union, '08; *A. H. Lauder, University of Wyoming, '22; *Domenico Martignone, Central Technical College of London, '01; *F. N. Neal, University of Utah, '31; *D. R. Shoults, University of Idaho, '25; F. C. Smith, Drexel Institute, '06; *L. A. Umansky, Polytechnical Institute of Petrograd, '15; R. E. Worstell, Purdue University, '25.

If any one generalization could be made to cover the qualifications for this award, it would probably hinge upon the extent to which an employee took advantage of his opportunities, beyond the ordinary routine of his work to achieve an outstandingly worth-while result.

**Former G-E Test man*



LIGHTNING GUIDER

AFTER three years of photographing natural lightning striking the Empire State Building in New York City, it was determined that many lightning strokes which appear to crash from the clouds to the ground actually are met part way by a small flash, originating from the earth, which guides the stroke to its destination.

In addition, laboratory tests, under the direction of Karl B. McEachron, graduate of Purdue University and former G-E Test man, indicate that discharges between points and planes always begin at the point. The Empire State represents to the cloud a tremendous needle on the earth's surface. Thus the guiding flash will originate from the tower and shoot upward.

Destruction occurs when a lightning bolt contacts a high-resistance area. Lightning conductors prevent this by grounding the discharge in an area of low ground resistance, and the lightning control on the Empire State affords a protective area within a radius of approximately one mile.

GENERAL ELECTRIC

90-57DH